CHILDREN'S NUTRITIONAL STATUS IN BALI: CULTURAL AND PROGRAMMATIC ASPECTS

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Declaration

Except where otherwise indicated
this thesis is my own work.

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Acknowledgements

Now it is time to finish my thesis, the first thing I want to do is to thank God for keeping me safe. I wish to express my deep gratitude to both individuals and institutions, whose support and help have made my study possible, though it would be impossible to acknowledge adequately all by name.

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Abstract

Despite the success achieved by the Family Planning Coordinating Board (BKKBN) in the country-wide use of effective contraceptive methods resulting in a dramatic decline in fertility, a number of studies have indicated that the prevalence of malnutrition particularly among children under five years of age is still high. Some believe that this high prevalence of malnutrition is one of the most important factors in keeping child and infant mortality rates relatively high compared with those in the neighbouring countries. On the basis of this rationale the government launched a program called *KB-Gizi Terapdu*, the Integrated Family Planning and Nutrition Program (IFPNP) aimed at improving the nutritional status of the community.

This thesis describes the findings underlining the changes in children's nutritional status, using the 1980 and 1985 IFPNP surveys conducted in Bali. The surveys used only households of pregnant and lactating women, covering 1236 households in 1980 and 936 households in 1985. The surveys were conducted in the *banjar* consisting of 39 program *banjar* and 39 non-program *banjar* in the same areas in 1980 and 1985. All children aged under five years were used for the source of this thesis.

The findings are that from 1980 to 1985, children's nutritional status was significantly improved from weight for height assessment, slightly improved from weight for age assessment, but there was no improvement from height for age assessment. The prevalence of current contraceptive users among lactating women increased siggnificantly and the fertility rates slightly declined. Balinese women's educational level was among the lowest in Indonesia. This was probably one of the key impeding factors in household socioeconomic development responsible for the persistence of a high prevalence of children's malnutrition, and high child and infant mortality rates.

It is hard, however, to find the magnitude of the improvement in the nutritional status of children aged under five years which can be attributed to the Integrated Family Planning and Nutrition Program. Neither a single program implementation variable nor one

socioeconomic variable was proved to have stronger influence on the improvement of children's nutritional status than another. The improvement in the nutritional status of children in the IFPNP surveys from 1980 to 1985 seems rather to be the result of many influences including the IFPNP activities and supported by the Balinese Hindu culture.

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Chapter 1

Background

1.1. Nutritional problems of children

Throughout the world in recent decades, leaders and scientists have become increasingly aware of the quality of infant and child life, and increasingly interested in improving it. A global promotion of 'Child Survival Revolution' by UNICEF, for example, is based on a strategy called GOBI-FF, the acronym for growth monitoring, oral rehydration therapy for diarrhoea, breastfeeding, immunization, food supplements, and family planning (Mosley, 1984: 3). WHO and UNICEF working jointly have targeted immunization for all children of the world by the year 2000 (Rockefeller Foundation, 1984: 14).

In Indonesia health problems of children, particularly of those under five years of age, are well recognized. Several studies conducted in different parts of Indonesia have revealed that the major causes of deaths of infants and children under five years of age are infectious and parasitic diseases, as terminal causes, and immaturity and nutritional deficiency as the important associated causes (Puffer, 1983). Nutritional deficiency as the associated cause of death, in particular, has drawn the attention of the government to implementing programs focusing on the improvement of nutritional status of the population. This was initiated by President Soeharto in 1974 when he called upon ten ministers to join in a co-ordinated effort of the Family Nutrition Development Program (UPGK) which was launched in 1977 with the assistance of international agencies such as UNICEF and USAID (Rohde and Hendrata, 1984: 253).

Meanwhile the Family Planning Co-ordinating Board (FPCB) proved to be successful in achieving high contraceptive acceptance rates resulting in a dramatic decline in fertility rates (Hull, Hull, and Singarimbun, 1977). This success, however, was not supported by better health and nutritional status of the community, particularly of children aged under five years. This was indicated by the persistence of relatively high infant mortality rates

compared to neighbouring countries such as Singapore, Malaysia, Thailand, Philippines, and Sri Lanka. Recognizing the facts on the departmentally operated Family Nutrition Development Program, the high infant mortality rates, and the success of FPCB in reducing fertility, the government considered that an integrated program would be more appropriate. So another program called *KB-Gizi Terpadu*, the Integrated Family Planning and Nutrition Program (IFPNP), was launched in 1980 under the co-ordination of the FPCB assisted by USAID. One of the provinces conducting the IFPNP since the first year in 1980 is Bali. Before embarking on a detailed examination of the program, a short review of the Bali situation will be presented.

1.2. Geographical situation, population, and social organization

1.2.1. Geographical situation

Lying between 114°25' and 115°43' East Meridian and between 8°03' and 8°51' South Latitude, this province together with other small islands such as Nusa Penida, Nusa Lembongan, and Nusa Ceningan on the south-east side and Nusa Menjangan on the north-west side is 5,561 square kilometres in area or 0.29 per cent of the total area of Indonesia. The mainland of Bali is divided into north and south portions by a highland area stretching from the west to the east. Apart from the Mediterranean Chain there are a number of volcanic mountains such as Mount Agung (3,274 metres), Mount Batukaru (2,276 metres), and Mount Batur (1,717 metres). Mount Agung and Mount Batur, which are still active, last erupted in 1963.

The land use in Bali is categorized as follows: 17.8 per cent of irrigated rice fields, 27.9 per cent of dry fields, 23.3 per cent of forestry, 25.9 per cent of plantation, and 6.1 per cent of others. The irrigated rice fields are particularly interesting because these are usually beautifully terraced to allow the water to flow slowly so that erosion can be prevented. Water distribution to the rice fields is controlled by a community organization called *Sekaha Subak*. This organization is different from *banjar*, because *Sekeha Subak* may cover several village areas. The art of making terraced fields is not only applied to the wet fields but also to any steep fields. In Nusa Penida island, for example, where there are no wet rice fields, terraces are made from stones or rocks to support the higher levels of dry fields.

Forestry is mainly located in the highland areas, where coffee and cashew nuts are also planted. At the foot of Mount Batukaru there are three small lakes: Bratan, Buyan, and Tamblingan; while at the foot of Mount Batur is Lake Batur. These lakes are the main sources of fish for the villages surrounding and probably also the main water reservoirs for the lowland areas. Around Lake Batur is located the village of Terunyan which has a unique tradition of not burying the dead as is done in the rest of Bali. The largest hot spring Toya Bungkah is located at the west end of the lake. Formerly this hot spring was very commonly used by patients suffering from skin diseases, probably because of the high concentration of sulphuric acid in the water. The lowland areas are planted with groves of coconut trees at the high waterline. Beaches are important for Balinese to conduct certain ceremonies, and some temples are located along the beach such as the Serangan, the Goa Lawah, and the Tanah Lot.

The active volcanoes such as Mount Agung and Mount Batur, and the lakes surrounding the volcanoes which function as water reservoirs, have probably kept Bali fertile. On its small area compared to that of Indonesia Bali produces commodities for export such as coffee, copra, bali-oranges, *salak*, cows, and pigs. Bali also produces enough rice to send to other islands.

1.2.2. Population

The population of Bali can be grouped into two kinds of communities: communities with the caste system, and communities without the caste system. The communities without the caste system mostly live in the highland villages, while those with the caste system are mostly in the lowland. With regard to the timing of their migration to Bali, those without the caste system are believed to have been in Bali before Bali was conquered by the Majapahit Kingdom around 1400 A.D. So people sometimes claim themselves to be the *wong Majapahit*, Majapahit people, while the others are called *Baliaga* people. However, most of these groups, both without and with the caste system, are followers of the Hindu religion.

Although the number of 300,000 persons was mentioned as the population of Bali around 1600 AD (Hanna, 1976: 9) the total population was not known until the Dutch government conducted an enumeration for the first time in 1920 when the population was

947,233. When the census was conducted in 1930, the total population was found to be 1,101,393. After Independence the number enumerated in 1954 was 1,519,041. In the population census conducted in 1961 the total number was 1,795,920 and this increased to 2,210,091 in the 1971 population census. By the 1980 population census the total number had increased to 2,469,930 and it increased again to 2,649,401 in the Intercensal Population Survey in 1985 (CBS, 1987: 1).

The population in 1980 was distributed as follows: Jembrana 8.5 per cent, Tabanan 13.9 per cent, Badung 20.4 per cent, Gianyar 12.4 per cent, Klungkung 6.0 per cent, Bangli 6.5 per cent, Karangasem 12.7 per cent, and Buleleng 19.7 per cent. The population density for Bali in 1980 was 511 per km^2 and increased to 548 per km^2 in 1985. The regional population density per km^2 in 1985 was distributed from the highest: Badung 1,013, Gianyar 732, Buleleng 502, Klungkung 472, Tabanan 431, Karangasem 388, Jembrana 358, and Bangli 357.

The proportion of the male population aged under 15 years decreased from 40.1 per cent in 1980 to 36.7 per cent in 1985, and for females decreased from 37.8 per cent in 1980 to 34.6 per cent in 1985. The proportion of population aged 65 years and over increased slightly, for males from 4.7 per cent in 1980 to 5.0 per cent in 1985, and for females from 4.8 per cent in 1980 to 5.3 per cent in 1985. So the proportion of males was higher than that of females in younger age groups, but lower than that of females in older age groups in both 1980 and 1985. The highest proportion of population in 1980 was in the age group 5-9 years, but in 1985 this moved to the age group 10-14 years. The shift of the highest population proportion to the higher age groups, along with the falling proportion of the population in the younger age groups, is a result of the decline in fertility, brought about partly by the family planning program (Figure 1.1, Figure 1.2, and Table 1.1).

1.2.3. Social organization

The conquest by Majapahit, a Kingdom in East Java around 1400 AD, had a remarkable influence on Balinese cultural development. The Hindu priest Danghyang Nirartha and the Buddhist priest Danghyang Astapaka were both very active and responsible as religious advisors to the King. When the centre of the Kingdom was moved from Gianyar (believed to be at the village of Sasih) to Gelgel in the Klungkung region, all leaders

Figure 1-1: Population pyramid of Bali, 1980.

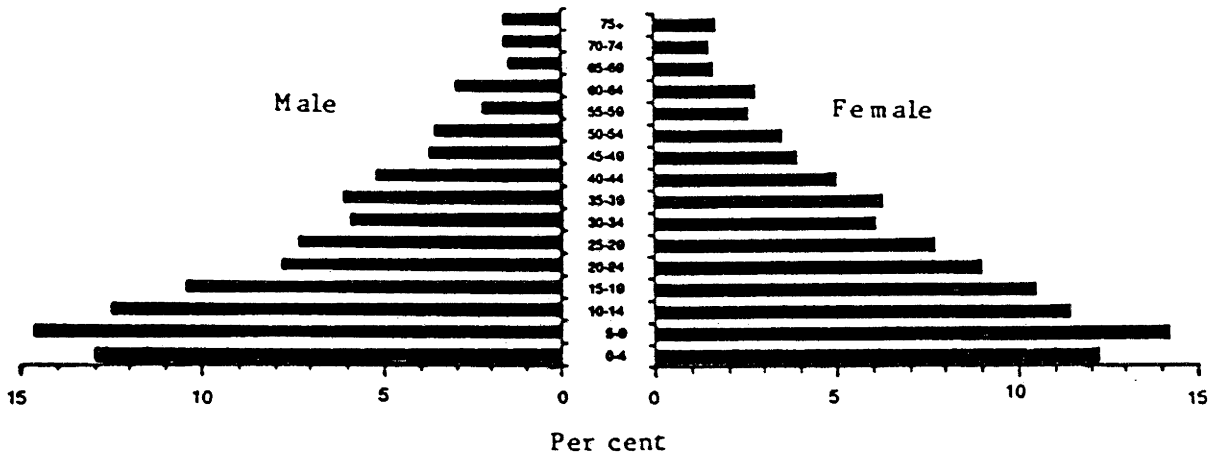


Figure 1-2: Population pyramid of Bali, 1985.

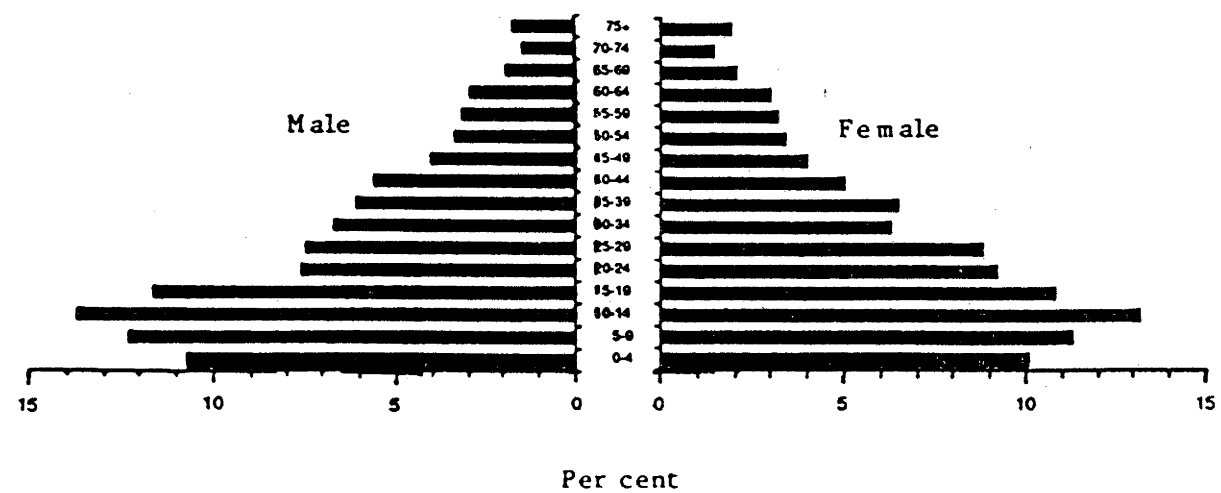


Table 1.1. Percentage of population by age and sex, 1980 and 1985, Bali.

Age group (yrs)	Per cent			
	1980*)		1985**)	
	Males	Females	Males	Females
0-4	13.0	12.2	10.7	10.1
5-9	14.6	14.2	12.3	11.3
10-14	12.5	11.4	13.7	13.2
15-19	10.4	10.5	11.6	10.8
20-24	7.8	9.0	7.6	9.2
25-29	7.3	7.7	7.4	8.8
30-34	5.9	6.1	6.7	6.3
35-39	6.1	6.3	6.1	6.5
40-44	5.2	5.0	5.6	5.0
45-49	3.7	3.9	4.0	4.0
50-54	3.6	3.5	3.3	3.4
55-59	2.2	2.6	3.1	3.2
60-64	3.0	2.8	2.9	3.0
65-69	1.5	1.6	1.9	2.0
70-74	1.6	1.5	1.4	1.4
75+	1.6	1.7	1.7	1.9

Source: *) Sudjono, 1986: 31.
**) CBS, 1987: 1.

assisting the Prime Minister Gajah Mada from Majapahit were appointed kings of smaller kingdoms all over Bali, including Buleleng, Jembrana, Tabanan, Mengwi, Badung,

Gianyar, Payangan, Bangli, and Karangasem. After Independence the royal system was changed to democratic government in 1950. Bali was declared to be a province in 1958 and the capital city, formerly located in Singaraja, the capital of Buleleng regency, was moved to Denpasar.

Administratively Bali is a province of Indonesia, consisting of eight regencies (*Kabupaten*): Jemberana, Tabanan, Badung, Gianyar, Klungkung, Bangli, Karangasem, and Buleleng. Each regency consists of a number of districts (*Kecamatan*), and each district consists of a number of villages (*desa*). The lowest unit of official administration in Bali is the traditional community organization known as *banjar*. The province is headed by a Governor who is directly responsible to the Minister of Home Affairs. He has the right to hold two 4-year official terms elected by the Provincial House of Representatives (DPRD) with the agreement of the President as the top decision maker. The regency is headed by a *Bupati* and the *kecamatan* by a *Camat*. The *banjar* organization is under the village administration. As the lowest official administration the *banjar* is headed by a *Kelian Dinas* who has a different function from the *Kelian Adat*, who is responsible mainly for the traditional activities of the community. The position of *Kelian Dinas* and *Kelian Adat* can be held by one person or two persons. If the *banjar* has two *Kelian*, the *Kelian Dinas* is responsible for the operation of the IFPNP.

A *banjar* is usually identified by a community temple called *sanggah* or *pemerajan*, a community hall called *bale banjar*, and a building called *bale kulkul*, where the wooden alarm drum is hung. The community hall is used for the community activities such as the *banjar* temple ceremonies, cremation ceremonies, and meetings of the *banjar* members. There are two kinds of *banjar* membership, active and passive. The active members are those actively capable of carrying out *banjar* activities, and the passive ones are old people or those who are held to be passive members *nganutin adat banjar soang-soang*, under the local community regulations. The membership of the *banjar* is usually spontaneous as soon as a new family is established. An active member can spontaneously become a passive member if a family is broken for any reason. The members of the *banjar*, called *krama banjar*, usually participate in one of the smaller community activity groups or clubs called *sekeha*, depending on the interest of the members such as *sekeha pebat*, the cooking club, *sekeha gamel*, music instrument players, *sekeha igel*, dancers, and *sekeha kidung*, choir.

1.3. The IFPNP implementation in Bali

In 1974 the Bali provincial FPCB conducted a feasibility study on the use of the *banjar* organization system to carry out the family planning program at the grass-roots level. After the study was completed in 1976, the family planning program has been carried out through the *banjar* organization since 1977 (BKKBN Bali, 1979a: 1). When the IFPNP was implemented in 1980, the *banjar* organization was used for the area units of the program.

When the IFPNP started in 1980 it covered only 231 out of about 3700 *banjars* in Bali (BKKBN Bali, 1979b: 8). This number was based on the number of nutrition field workers available at that time totalling 231 and distributed in regencies as follows: 21 in Jembrana, 34 in Tabanan, 43 in Badung, 27 in Gianyar, 17 in Klungkung, 16 in Bangli, 29 in Karangasem, and 44 in Buleleng. The program specifically targeted the vulnerable groups of population: children under five years of age, lactating mothers, and pregnant women. The program interventions primarily consist of weighing activities, food supplement demonstration, worm medication, and high dose (200,000 IU) vitamin A distribution every six months, and oralyte distribution for diarrhoeal diseases, for children; iron tablet distribution daily for the third trimester pregnant women; and family planning consultation. Most activities are held at weighing posts which are usually located at the *bale banjar*, the community hall, regularly once a month.

1.4. The 1980 and 1985 IFPNP surveys

1.4.1. Sampling frame

Included in the program activities were surveys, two of which were the 1980 and 1985 Integrated Family Planning and Nutrition Program (IFPNP) surveys. Both surveys were conducted by the Population Studies Centre of Udayana University, and I was in charge as the principal investigator in both surveys. The survey of 1980 was designed to use multistage random sampling. At the district levels it was decided to take eight out of 51 by a systematic random sampling (Figure 1.3). All *banjars* where the program was implemented in the selected districts were taken to be *banjar* samples, and called the program *banjar* in the survey, totalling 39. Each program *banjar* is located in one village. The other 39 *banjars* located in the same villages as the program *banjars* were also

selected to be *banjar* samples and called non-program *banjar* in the survey. So the total number of *banjars* is 78 consisting of 39 program *banjar* and 39 non-program *banjar* (see Appendix A).

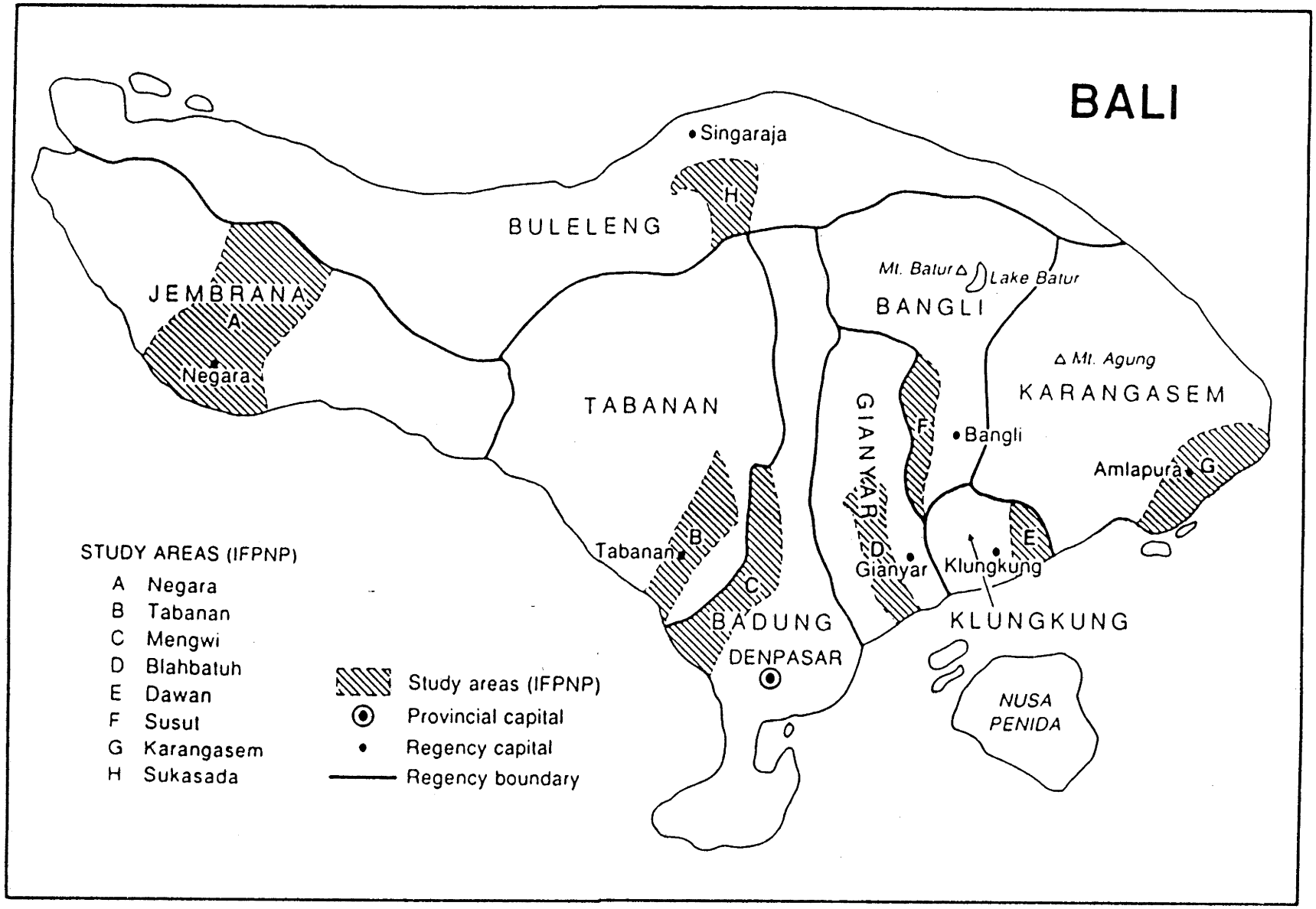
At the *banjar* level it was decided to use only households containing pregnant women and lactating women as the sample unit. The number of households selected was proportional to the number of pregnant and the lactating women, which was drawn from the household-listing data. In the 1980 IFPNP survey it was decided to simply take 16 households in each *banjar*. The rationale for taking this number was to get a sufficient number of malnourished children which was based on the existing results of surveys conducted in different parts of the country. In the 1985 IFPNP survey the same *banjar* was used to be the *banjar* sample. The number of pregnant and lactating households was decided to be 12 in each *banjar* (another six households with neither lactating nor pregnant women were collected in the 1985 survey but excluded from analysis to ensure consistency of the data with the 1980 IFPNP survey). At the household level, the household samples were selected by systematic random sampling. All children aged under five years of the selected respondents (lactating and pregnant women) were used as the source for this study.

1.4.2. Instruments for data collection

The main instruments used for data collection consisted of closed questionnaires for household data, scales for children's anthropometric data, the Sahli Haemoglobinometer set for mothers' haemoglobin examination, and containers for children's stool examination. Data were collected through house-to-house visits. The household data were collected by the students of Udayana University. Children's anthropometric data, children's stools, and mothers' blood were collected by nurses of local Health Centres. The children's stools were collected only in the 1980 IFPNP survey. Stool examination for worm infestation was done by the Department of Parasitology, Faculty of Medicine of Udayana University.

Anthropometric measurements were taken in the respondents' homes. Weight of children was measured by a hanging scale *dacin* which has a capacity up to a maximum of 25 kilograms with increments of 100 grams. A 'pant bag' for older children and a

Figure 1-3: District study areas on Bali



rattan box were specially designed to measure the weight of children. Height is measured in a standing position for older children without shoes or sandals, and in recumbent position for infants, with a wooden length-board. The measuring scale was in centimetres and capable of measuring to an accuracy of 0.1 centimetre.

1.4.3 Data processing

Data entry of the 1980 IFPNP survey was done in the University of Indonesia Computer Centre, Jakarta, and the conversion of children's anthropometric data to nutritional status was done by the CSF Ann Arbor Michigan. The data entry of the 1985 IFNP survey was done in the University of Udayana, Denpasar and University of Brawijaya, Malang; data cleaning was done in the Community Systems Foundation, Ann Arbor, Michigan. The conversion of children's anthropometric data to nutritional status of the 1985 IFPNP survey was done at the Child Survival Project, Department of Demography, Australian National University, Canberra.

The conversion of children's anthropometric data to nutritional status was done for three indicators: weight for age (WFA), height for age (HFA), and weight for height (WFH), using the WHO standard of 1983. WFA reflects current nutritional status, WFA global nutritional status and HFA past nutritional status.

1.4.4. Data analysis

Nutritional status using the indicators of WFA and HFA has disadvantages compared with from WFH in that both WFA and HFA use age information which is mainly based on unregistered data, whereas WFH is based on measurement. On the basis of this consideration only WFH is used to represent nutritional status as the dependent variable with any independent variables such as demographic characteristics, family planning variables, and socioeconomic and cultural variables.

Descriptively the nutritional status indicators are interpreted as follows: -3 SD or less is severe malnutrition, more than -3 SD up to -2 SD is moderate malnutrition, more than -2 SD up to -1 SD is mild malnutrition, and more than -1 SD and over is normal nutritional status. The statistical analysis was mostly done by using the SPSSX package program, using dichotomous analysis for the nutritional status with the cut-off point -1 SD and less

for malnutrition and more than -1 SD for normal nutritional status. Nutritional status differences between program *banjar* and non-program *banjar* and between 1980 and 1985 are analysed. Cross-sectionally, wherever appropriate, multiple regression analysis is employed to capture the magnitude influence of certain specific variables on children's nutritional status.

1.5. Objectives

The main objective of this thesis is to analyse the changes in children's nutritional status between the 1980 and 1985 IFPNP surveys. Using the nutritional status of children under 5 years of age as the outcome variable, some independent variables are tested in relation to the difference or change in the nutritional status between program and non-program *banjar*, between male and female children, and from 1980 to 1985.

The independent variables are grouped into: types of intervention in the program, demographic characteristics mainly of mothers, the knowledge and use of contraceptive methods, and a number of socioeconomic and cultural factors. The strength and weakness of the independent variables in relation to nutritional status are used as feedback to the program.

The magnitude of program influences on the nutritional status of children under 5 years of age is derived from the difference in the nutritional status between program and non-program *banjar* and before (1980) and after (1985) the program.

1.6. Literature review

1.6.1. Concept, definition and assessment of nutritional status

Nutritional status *per se* is an abstract concept (Jelliffe and Gurney, 1974: 1 See also Butz et al., 1981; Waterlow, 1988; Carlson and Wardlaw, 1990): depending on the assessment methods employed a person may be diagnosed as in a status of overnutrition, normal nutrition or undernutrition. All methods, however, are basically manifested by the nutrient levels, which consist of carbohydrates, proteins, lipids, vitamins, and minerals, in addition to water and fibres, which are needed for the growth and development of the body. With either deficiency or excess of one or more of the nutrients, a disorder in the metabolism process will occur resulting sooner or later in a

manifestation of symptoms and signs of nutrient deficiencies or excesses, both of which are categorized as malnutrition. However, since malnutrition from an excess of nutrients is regarded as a phenomenon of a more affluent community, here malnutrition focuses only on nutrient deficiencies.

Nutritional assessments can be undertaken directly or indirectly. The example of indirect assessments includes food balance sheets and crop calendars to infer the availability of per capita food, examination of food prices to infer the community's ability to purchase an adequate diet, and examination of morbidity and mortality experience to infer evidence of poor health or death as a result of malnutrition. The direct method of assessments can be based on food intake measurement or analysis of food consumed, clinical signs and symptoms, biochemical assays, and anthropometry. The present concern is mainly with anthropometric assessment following a brief clinical diagnosis of nutritional status.

The most severe and widespread nutritional deficiency predominantly found in children is protein and energy malnutrition (PEM). This term may be used differently such as protein and calorie malnutrition (PCM), nutritional oedema or dystrophe, according to the emphasis of the diagnosis. In extreme forms these are clinically identified as *kwashiorkor* and 'marasmus'. *Kwashiorkor* was first described in 1933 by Dr. Cicely Williams, a British pediatrician, who noticed the disease in children in the West African country of Ghana. The word *kwashiorkor* is derived from the Ga language and means 'the sickness of the deprived child' (Robson et al., 1972 :62). The disease usually occurs in children aged one to three years who suffer primarily from a shortage of protein. Children suffering from *kwashiorkor* tend to be apathetic, irritable, weak, and inactive. They are always underweight, although this may be masked by oedema which varies from a mild puffiness around the eyes and swelling of the feet and hands to a massive oedema and the enlargement of the liver due to fatty liver. A 'hepatic posture' may appear: this is characterized by dehydration of the upper part of the body and oedema of the extremities especially of the lower parts.

The skin of *kwashiorkor* children is characteristically patchy with pale and dark skin alternating; the hyperpigmented areas may desquamate to appear flakey. Ulcerations are common in *kwashiorkor* children with predilection areas at the flexures, the groin and the

buttocks. The hair is usually fine, straight and hyperpigmented with alternating areas of normal and hyperpigmentation in a single hair which is known as 'flag sign'. The body is often hypothermic and appetite is usually bad which can worsen the nutritional status and facilitate suffering from infection where measles, chicken pox or whooping cough is often the precipitating cause of the disease. Deprivation of growth is common and if the children recover from *kwashiorkor*, height for age is more retarded than weight for age.

Another extreme form of PEM is called marasmus. This occurs predominantly in infancy, usually if mothers fail to lactate or if they feed cows' milk which is inadequate in quantity or too dilute. Both protein and energy are inadequate, so growth stops, and the infant is thin, undersized, and underweight. A marasmic child is characterized by gross wasting of muscle and subcutaneous fat. The appetite is usually good and skin disorders, psychological discrepancies and enlargement of the liver are less common than in *kwashiorkor*. The growth is stunted without oedema being detected. Since clinically *kwashiorkor* and marasmus may sometimes be difficult to differentiate it is suggested that the term marasmus should be used to describe a child that is less than 60 per cent of its standard weight for age and who has no oedema detected, while *kwashiorkor* would be used to describe a child with a weight of 'less than 60-80 per cent of median standard' for its age, and with oedema. The term underweight would be applied to a child with a weight of 'less than 60-80 per cent of median standard' for its age and without oedema.

Garrow (Waterlow, 1976: 532) classified severe malnutrition according to the following criteria: 1. A child whose expected weight for age falls below 70 per cent, using Harvard standards, 2. *Kwashiorkor* if a child has a minimum weight which is not less than 60 per cent of expected weight for age with the present of oedema and either with hepatomegaly or dermatosis, 3. Marasmus if a child achieves weight less than 60 per cent of expected weight for age without oedema or other specific signs, and 4. Intermediate marasmic *kwashiorkor* if a child achieves weight less than 60 per cent of expected weight for age and with oedema or other signs of severe malnutrition. In line with Garrow's classification a working party proposed the so-called Wellcome classification in 1969. This classified malnutrition into two criteria: weight achievement of less than 60 per cent of standard with oedema is *kwashiorkor* or without oedema is undernutrition and weight achievement of 60-80 per cent of standard with oedema is marasmic *kwashiorkor* or without oedema is marasmus.

Gomez (Waterlow, 1976: 535) classifies malnutrition into three grades: first degree for children achieving weight 75-90 per cent of the standard, second degree for children achieving weight 60-74 per cent of the standard, and third degree for children achieving weight less than 60 per cent of the standard. A similar classification but with different intervals was proposed by Jelliffe, for weight achievements: less than 60 per cent, 60-69 per cent, 70-79 per cent, and 80-89 per cent of the expected weight for age (Harvard standards). The classification on the basis of weight for age, however, has a major difficulty that there is no written document on births in many communities so that the precise ages of children are not known.

A concept of the importance of measurements of height to be regarded as a measure of the duration of malnutrition was later developed by the Joint FAO and WHO Expert Committee on Nutrition. The weight for height index is of current nutritional status, height for age is of the past nutritional history. Qualitatively therefore, children may fall into the broad categories of either normal, wasted but not stunted (i.e, suffering from acute malnutrition), wasted and stunted (i.e., suffering from acute or chronic malnutrition), stunted but not wasted (dwarfism). Finally, the WHO staff members (WHO, 1983: 27), using the combination of indicators of weight for height, weight for age, and height for age, proposed the interpretation of nutritional status of children. Nine out of 17 combinations are presented in Table 1.2.

Anthropometric assessment is based on the measurements of body size. This method of assessment is mainly concerned with the detection of protein and energy malnutrition of early childhood, particularly for cross-sectional surveys (Jelliffe and Gurney, 1973: 4). The most common measurements undertaken are height, weight, skinfold, upper-arm circumference, head circumference, and chest circumference. Nutritional status is assessed by matching the measurement of parts of the body such as by height for age, weight for age, and weight for height with the standard population. The Harvard standard, for example, employs the percentage achievement of the body measures to indicate a nutritional status. Using weight for age assessment, for example, this is interpreted as follows: up to 60 per cent as severe malnutrition, more than 60 per cent up to 80 per cent as mild malnutrition, and more than 80 per cent as normal nutritional status.

Table 1-1: Combination of indicators and its interpretation of nutritional status.

Combination of of indicators	Interpretation of nutritional status
Nrm wt/ht+low wt/age+low ht/age	Normally fed with past history of malnutrition.
Nrm wt/ht+nrm wt/age+nrm ht/age	Normal
Nrm wt/ht+high wt/age+high ht/age	Tall, normally nourished
Low wt/ht+low wt/age+high ht/age	Currently underfed ++
Low wt/ht+low wt/age+nrm ht/age	Currently underfed +
Low wt/ht+nrm wt/age+high ht/age	Currently underfed
High wt/ht+high wt/age+low ht/age	Obese ++
High wt/ht+nrm wt/age+low ht/age	Currently overfed with past history of malnutrition.
High wt/ht+high wt/age+nrm ht/age	Overfed but not necessarily obese

Source: WHO, 1983: 27.

1.6.2. Factors affecting nutritional status

Factors affecting nutritional status can be classified differently, depending on the interest of the authors. In the individual, nutritional status is simply determined by the balance between the amount of nutrients absorbed and the amount required by the body. The nutrients consist of proteins, carbohydrates, lipids, vitamins, minerals, water, and fibres. The optimum amount of each nutrient required for growth and development is varied because of specific percentage composition of body contents for sex and age. An example of the percentage composition of body contents is presented in Table 1.3.

Table 1-2: Percentage composition of body contents.

Nutrient	Body contents (%)		
	Men	Women	Fat-free
Water	62	54	72
Protein	17	15	20
Fat	14	25	-
Minerals	6	5	7
Carohydrate	1	1	1

Source: Taylor, 1978.

The balance of nutrients in the body can be optimum, positive or negative. It is optimum if the nutrients absorbed are equal to the amount expended for growth and function of cells, tissues, or organs of the body. An optimum balance may also be termed as a physiologically positive balance, considering the dynamic process of growth and

function. A positive balance is a condition of the excess of intake over requirement, and a negative balance if it is less than required. Thus, an optimum or physiologically positive balance is equal to normal nutrition, a positive or negative balance may be manifested in malnutrition either of excess or deficiency state of nutritional conditions.

A comprehensive list of factors affecting nutritional status at the community level was proposed by Robson et al. (1972: 105). These may be grouped into: primary factors consisting of poverty as the result of disasters and maldistribution of wealth, lack of education and sanitation, ignorance and carelessness, lack of habituation and maternal deprivation, and taboos or cultural food habits; secondary factors consisting of congenital defects, increased dietary needs, malabsorption as the result of gastrointestinal diseases and the changes of gastrointestinal function, other diseases; and the combination of primary and secondary factors. Aylward and Jul (1975: 18) proposed some reasons for malnutrition with special reference to protein deficiency such as: proteins are required in considerable amounts compared to other nutrients; protein foods are usually among the most expensive foods and thus protein deficiency diseases must be regarded as the major cause of malnutrition in most low-income countries; the existence of cultural obstacles to change the dietary patterns of consuming the available protein-sources of foods; inadequate methods of diagnosis because it frequently appears together with other diseases; and the difficulty in keeping the foods (protein) stable in the process of storage and cooking process. The following are some studies dealing with some of the factors related to nutritional status.

A study on nutritional profile of pregnant women and lactating mothers conducted in Bali in 1980 (Gunung et al., 1981) found that a number of common protein-source foods, despite being relatively easily available, are taboo for pregnant women, lactating mothers and children aged 1-4 years. Beef, for example, is eaten by most Balinese except people in the village of Songan and certain people such as priests, however it is taboo to certain women when pregnant and lactating and also to children aged 0-4 years. The taboos are not necessarily from beliefs or religious reasons but because of 'old wives' tales' to avoid suffering from itching (for fish), abdominal ache (for pork or beef), unerupted teeth (for egg), worm infestation (for meat), and so on. So lack of education, particularly of knowledge of nutrition, is at least partly involved in the taboos. The types of food considered taboo vary in each study area (there were eight regencies covered in the

study). These foods include: for pregnant women, beef, pork, egg, fish, prawns; for lactating mothers, beef, pork, egg, fresh fish, dry fish, prawns, young honey bee, eel; for children aged 0-4 years, beef, pork, prawns, fresh fish, dry fish, egg, and water snail (*kakul*).

A number of immunizable diseases have a high risk on nutritional status, morbidity, and mortality of young children. Four diseases consisting of neonatal tetanus, whooping cough, measles, and acute lower respiratory tract infection, for example, are responsible for one-third of deaths of children aged under five years in the developing countries (Foster, 1984: 119). Measles among the viral infections is an endemic disease in children aged six months to five years (Maxwell, 1977: 148), and was commonly epidemic before the mass immunization campaign by attenuated virus preparations was conducted. In Indonesia this disease usually breaks out in the transition between rain and dry seasons when the body resistance to diseases usually declines.

Patients suffering from measles usually have a high body temperature with a Koplik spot on the buccal mucosa during the incubation period which lasts 5-6 days. When the rash begins to appear from the forehead and around the ears, then spreads progressively to the face, trunk, and limbs, the fever decreases. The nutritional status of the victims is a very important factor for the prognosis of the disease. A study conducted in Bangladesh suggested that diarrhoeal deaths were highly associated to meales. Diarrhoeal diseases mainly caused by Vibrio cholerae, Shigella species, Salmonella typhi, rotaviruses, and enterotoxigenic Escheria coli, on the other hand may be associated with poverty, but not necessarily with the improvement of water quality (UNICEF, 1985: 83).

A neonatal tetanus caused by a bacillus called Clostridium tetani is usually associated with the application of undesirable materials to the umbilicus at birth. Specific features of this disease are difficulty in mouth opening called *trismus*, stiffening of limbs and fist clenching, the head is episthotonic and in older children, the teeth bared known as *risus sardonicus*. A high risk of death occurs to the disease with incubation period less than 10 days after birth, usually due to anoxia or pulmonary complication. The household health survey conducted in Indonesia in 1980 found that diarrhoea, tetanus, diphtheria, and measles were among the ten leading causes of death in children aged 1-4 years (Budiarso, 1983: 87).

Using birthweight as an indicator of nutritional status of children Puffer and Serrano (1975: 22-28) suggested an association between nutritional status and age of mothers and birth order. A birth cohort study conducted in the United States in 1950 found that the percentage incidence of low birthweight increased as birth order of children increased and the percentage incidence of low birthweight was higher among mothers aged under 20 years than 20-24 years. In the United States in 1960 the highest percentage incidence of low birthweight was found among mothers aged under 20 years and the lowest was among mothers aged 25-29 years. The positive relationship between birth order and the percentage incidence of low birthweight according to Puffer and Serrano was probably because of higher risk of dying of the low birthweight infants so mothers experienced more births to replace the dead children.

Beaton and Bengoa (1976: 507) suggested that birthweight is influenced by the nutritional status of the mother. Besides, conditions affecting the mother during her own growth and development and other factors such as maternal age, parity and birth order, sex distribution among infants, and socioeconomic stratum may at least indirectly influence infant's birthweight. The HANES program (Abraham, Lowenstein, and O'Connell, 1975) conducted in the U.S.A. in 1971-1972 found that boys (except at age two years) and girls (except at age one year) aged under five years, were taller and heavier among higher income families than lower income families.

1.6.3. Some experiences of nutritional intervention programs

1.6.3.1. Effect of high protein supplement on growth of children

A study to determine the effect of the addition of a high protein supplement to the diets of pregnant women on the growth of the offspring was conducted by Chow (1973) in Suilin Township in the western centre of Taiwan in 1967. The weight at birth of infants was especially used as the growth indicator in this study. The 294 pregnant women participating in the study fulfilled the following requirements: age of 20-28 years, habitual diet estimated to supply less than 40 grams of protein daily, married with at least one normal child, in third trimester of pregnancy at the time of enrolment, and wanted to have more children as soon as possible, fully co-operative, and normal upon routine physical examination with hemoglobin not less than 11 grams per cent, hematocrit not less than 36 per cent and plasma protein not less than 5.5 grams per 100 ml.

The women were divided into four groups: First A, first B, second A, and second B. The first A and first B groups began to be given supplementation at three weeks after delivery and the second A and second B groups during the pregnancy. Group A women were given 20 grams of milk protein and 400 kcal plus minerals and vitamins in each 12 ounce can, while group B women were given no protein, less than 40 kcal but the same levels of minerals and vitamins. Both specimens of liquid supplements had the same colour and flavour. Each subject consumed two 12-ounce cans of either A or B supplements daily in the presence of the field workers.

When the study was completed in June 1973, 213 out of 294 women had completed all requirements of the study. The average length of supplement was 38 months for both groups. The analysis on the average of birth weight and the percentage incidence of low birth weight yielded the following results: the average birth weight increased among the second study infants (the second births during the study) compared to that of the first study infants (the first births during the study) for male children of both mothers consuming supplement A and supplement B, but the increase was higher among children of mothers consuming supplement A. Among female children, however, a decrease in the average birth weight was even observed among the second study infants compared to that of the first study infants and there was not much difference in birth weight between children of mothers consuming supplement A and supplement B. The percentage incidence of low birth weight dropped significantly among all children of mothers consuming supplement A, while it remained the same for mothers consuming supplement B. So it was concluded that the increased consumption of protein might lead to a decrease in the risk of offspring suffering from malnutrition.

1.6.3.2. Effect of medical services and nutrition intervention on growth of children

A study aimed at exploring the relationship between infection and nutritional status of children aged under five years was conducted by the Nutrition Institute of Central America and Panama (INCAP) from 1959 to 1964 in three villages in the highlands of Guatemala covering a total population about 3000. The study was designed to give different kinds of services in each village. The first village was given only nutrition services. All children aged under five years were offered 100 per cent (amount) of daily protein allowance and one third of the average child's energy requirements. The second village was given only health services both curative and preventive designed to reduce

infection without directly affecting nutritional status. The health services included the operation of a medical clinic, a safe and continuous water supply, assisting the use of sanitary household privies, immunization against preventable childhood diseases, and promoting better hygienic practices. The third village was given neither nutrition services nor health services.

When the study was completed, it was found that in the first village about half of the village's children participated regularly in the food supplement receiving 75 per cent or more of the food supplement offered. The proportion declined steadily to one third in the fourth year and one fifth in the final year. In the second village every village child was treated at least once for illnesses, about half of the children were immunized, latrines were constructed but not used, water supply was improved and the amount available increased but the uses of improved water were modest.

There was no significant difference in the growth rates of children in the village with health services and the village with neither health services nor nutritional services. However, children in the village receiving nutrition services grew more rapidly than those in the other two villages especially after 12 months of age. At the age of five years children receiving nutrition services were about one kilogram heavier and about three centimetres taller than the average weight or average height of children in the other two villages. Both differences in weight and height were statistically significant at the 0.01 level. The study, therefore, proved an association between growth and food supplement especially of protein-rich foods which were used in the study, but not with only medical services.

A study with an almost similar purpose was conducted jointly by the Indian Council of Medical Research and the Johns Hopkins University (School of Hygiene and Public Health) in 10 villages of the Sikh religious community in Narangwal, India from 1970 to 1973. The villages were divided into four groups which received different interventions. The first group received nutrition care consisting of regular nutrition monitoring, selected food supplement for children and pregnant women, and nutrition education. The second group received medical care consisting of home visits and treatment to children, routine immunization, and clinic treatment. The third group received combined health and nutrition services to children and pregnant women, and the fourth group received

nothing. There were 1000 infants and children in the target population participating in the study.

The growth of children until 18 moths old was approximately the same in the four areas. Thereafter significant rapid growth was observed among children in areas receiving nutrition supplements. By the age of 36 months, they were 0.5-0.6 kilogram heavier and 0.2-1.3 centimetres taller than children in the fourth village. There was little difference in children's growth rates in areas receiving either only nutrition services or combined nutrition and medical services. The growth rates of children in areas receiving only medical services were higher but not significantly more than those of children in the fourth group of villages. This study also indicated a more important role for nutrition supplements than medical services in the growth of children.

1.6.3.3. Integrated approaches on improving nutritional status of the community

An integrated approach to improving the nutritional status of the community can be observed from the Czech experience (Krikava et al., 1973). In this country the importance of improving the nutritional status of the population attracted not only the attention of the public but also of the authorities who gave first priority to national development planning. Realizing the post World War II economic and other national problems especially with regard to feeding, and economic relief and rehabilitation, the goverment used rationing, production incentive, and price controls as the principal approaches to regulate supply and distribution of food stuffs with special attention directed to vulnerable and some productive groups of the population.

Central planning bodies called for co-operation, collaboration, and the concerted action involving many ministries. Special commissions consisting of various departments such as in agriculture, trade, health, social welfare, and labour were established. Their activities concentrated on preparing precise departmental objectives and programs to specify their responsibilities for food and nutrition policy adapted to local communities. By this stage a serious problem of infant feeding problems was detected. Small-scale surveys together with health services were conducted. The result of the surveys revealed insufficient intake of calories, and all nutrients especially proteins were far below requirements.

The authorities gave highest priority to preventive pediatric measures by providing better facilities for medical care and supplying of safe milk. A decline in mortality from infection was observed soon thereafter. When the countrywide surveys of production, distribution, consumption of food, and nutritional status were accomplished by 1950 it was found that in persons with deficiency signs, qualitative deficiencies prevailed over the quantitative deficiencies found formerly. The main cause of inadequate nutrition was insufficient consciousness of nutritional factors in diet and hence in developing an integrated nutrition program, the health educators emphasizing especially nutrition have a very important role. Since 1960 the problems of nutrition have been with regard to quality instead of quantity. Energy consumption increased from 2545 kcal in 1936 to 3113 kcal in 1967-68, total protein increased from 72.6 grams in 1936 to 90.9 grams in 1967-68.

1.6.4. Summary

Nutritional status as an abstract concept can be assessed directly or indirectly. All assessments either clinically, biochemically or anthropometrically are basically to acquire the nutrient levels, which consist of proteins, carbohydrates, vitamins, minerals in addition to water and fibres required for the growth and development. Depending on the assessment, nutritional status is classified differently. More importantly efforts are made to find the easiest and most convenient method of assessment, which can detect the inadequacy of the nutrients as early as possible. So far, anthropometric measurements seem to have more promise of the requirements with a little courage to provide information on age and conduct the measurements. Even if age information is not available, nutritional assessment is still possible from matching the measurements such as the weight for height.

There is a broad range of factors which can affect the nutritional status. The availability of foods as an absolute requirement both quantitatively and qualitatively is influenced by several other factors before it can be safely consumed. These factors include the capability of providing foods, which, to some extent depends on economic status, transport, communications and social status; education or specifically knowledge on foods; tradition, custom, belief, and taboos; food preparation and storage which is free from contamination by disease, poisonous, or dangerous agents. Certain conditions are

also required in order that the foods are optimally consumed in the body. This primarily affects the balance between anabolic and catabolic factors in the metabolic process. Excess of either anabolic or catabolic process leads to malnutrition. This is possible if there is disorder in the absorption process along the gastrointestinal tract, both congenitally and acquiredly.

No single variable proved to be more important than another to overcome problems of nutritional status. The HANES program showed that economic status did not always affect children's nutritional status. A continuous monitoring of nutritional status conducted in Czechoslovakia found that at a certain stage priority was given to controlling infectious diseases and later to the improvement of nutritional status. The study also found that attitudes and beliefs regarding foods was an obstacle in improving the nutritional status of the community. Despite the consideration that lack of protein is the most important cause of malnutrition in developing countries, a longitudinal study conducted in Taiwan failed to prove that high quality protein consumption by pregnant and lactating mothers improved nutritional status of female babies. Studies conducted in Guatemala and India, on the other hand, showed almost similar outcomes in that the health services must be combined or integrated with nutrition services to improve children's nutritional status. Both studies also observed that better nutrition services showed better growth of children after the age of 12 months. Although breastfeeding and food supplement were not specifically mentioned in the studies, the role of these factors cannot be ignored.

So an integrated program involving various sectors and combined interventions of at least health and nutrition services seems to be more popular and workable than if it is operated departmentally and with only specific intervention in improving the nutritional status of the community. Besides, other factors such as the study or program designs, location, time, and the condition of the community are important to be considered to gain a more successful improvement in community nutritional status.

Chapter 2

Balinese socio-cultural aspects of child health

2.1. Introduction

The Balinese socio-cultural system is a reflection of the Hindu religion, which has been maintained by the vast majority of the population throughout history. In the course of time, however, the religion is believed to have developed in such a way that it has been influenced remarkably by the beliefs and customs of the people residing on the island before and after the introduction of Hinduism, including a belief that life has no end but rather cycles through rebirths known as reincarnation. This development has created a unique Balinese socio-cultural system colouring the daily activities of the people.

The people's belief in reincarnation and *moksha* as part of *panca sradha*[1] probably has an important implication for child health; because having a child is not just intended to have a *santana*, offspring, who will continue the existence of the family, but more importantly it is also to have a *putra*, the son, the only one who can free the parents from hell to heaven when they have died. Consequently, a new married couple will try to have a child as soon as possible and if successful they will give as much attention as possible to keeping the child healthy and long living.

This chapter describes some of the socio-cultural factors which have a close relationship to child health. These include, for example, the concept of the origin of human beings, the *kama bang* female germ cell and *kama putih* male germ cell, and concept of the cause and healing of illness or disease. Other socio-cultural aspects such as the Balinese attitude towards multiple born children are also described in this chapter.

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[1]*Panca sradha*, the Five Principles of belief consist of: belief in *Sanghyang Widhi Wasa*, Almighty God; belief in *Atman*, the soul; belief in *moksha*, that is to return and dissolve to be one in God; belief in *Karma pala*, a reward or punishment effect of the previous life performance; and belief in reincarnation, the rebirths.

2.2. The origin of human beings: *Kama Bang* and *Kama putih*

The concept of the origin of human beings can be found from the combined sources of legend, belief and religion, which may vary from one village to another. Once the first human beings were created by Almighty God, the next generation was started from the meeting between *kama bang*, the female germ cell, and *kama putih*, the male germ cell. Each individual human being is part of *bhuwana agung* the macrocosmos, and in himself is found *bhuwana alit*, the microcosmos.

2.2.1. Life cycle of human beings

After the first human beings were created the life period as part of the reincarnation cycle was continued by way of fertilization between *kama bang*, the female germ cell, and *kama putih*, the male germ cell. The result is a unique individual human being who grows and develops to reproduce the next generation or offspring. Thus the life period can probably be classified into the stages of primordial, gestational, childhood and parental. The life period will finish if there is no *kama bang* or *kama putih* eligible during the parental stage, otherwise the primordial stage comes again and the life period continues. This growth and development of human beings is described in *Kanda Empat Buta* and *Kanda Empat Dewa* (Tjateng, 1979).

The primordial stage goes as follows. When the young *Sang Hyang Jagatkarana*, the man, turns his sight on the young and beautiful *Sang Ayu*, the girl, the primordial human being called *Sang Hyang Asmara Pendeleng* appears in their minds. The primordial human being changes his name as *Sang Hyang Jagatkarana* and *Sang Ayu* continue to make love. For example, when the couple start to talk to each other his name is *Sang Hyang Penuntun Iswaramadu*; when *Sang Hyang Jagatkarana* starts to touch *Sang Ayu's* breasts his name is *Sang Hyang Penguriping Jiwa*; and when the couple perform sexual intercourse his name is *Sang Hyang Sambu* if fertilization occurs at the time when *Kama bang*, the red germ cell or ovum from *Sang Ayu* meets *Kama putih*, the white germ cell or sperm from *Sang Hyang Jagatkarana*. This is the end of the primordial stage.

The gestational stage starts when the fertilized ovum developes into an early stage of a new individual human being called *Sang Hyang Maya Siluman*, the Appearance God from Disappearance or the Appeared Personified God. This takes place during the first

month after fertilization. This is later followed by his new name *Sang Hyang Semara Buncing*, the Bisexual God of Love. Then come *Dewa Nawasanga*, the Nine Gods to enter his body and his name now is *Sang Kamamanik Saprah.* When the form of a human being is completed, which takes place five months after fertilization, his name is called *Sang Kamareka.* All organs are completed in ten months after fertilization; his name is *I Gajah Petak* when birth is ready to occur and this is the end of the gestational stage.

The childhood stage is started as soon as the baby has been delivered and his name becomes *I Rare Kruncung*. As soon as the umbilical cord is cut his name changes again to *Sang Hyang Kumerancang Kumerincing*; and when he starts to breastfeed his name is *Sang Hyang Sinunganing*, then *Sang Hyang Menget Astiti Jati* when the navel dries and falls. Thereafter he continues to grow and develop. He develops to be interested in watching his parents, to turn his body, to speak baby talk, when his name turns to *Sang Hyang Japamantra.* When he starts to stand up he is called *Sang Hyang Tangan Sidi*, and *Asta Tunggal* when he is able to feed himself. Then he goes to visit his neighbours and makes jokes with his friends. When the development reaches the stage of having a desire to make love, the stage of childhood is finished and followed by the parental stage at the same time when the primordial stage also takes place and the next life cycle continues.

During the gestational stage the foetus in the womb is accompanied by *Kanda Empat*, the four brothers. The first brother is called *Babu Lembana*, the amniotic fluid which appears six months after fertilization, followed by *Babu Abra*, the blood, seven months after fertilization. Eight months after fertilization comes *Babu Sugyan*, the *vernix caseosa*, followed by *Babu Kekered*, the placenta ten months after fertilization. At birth the first to come out is *Babu Lembana* then *Babu Abra* followed by *Babu Sugyan* and *Babu Kekered.* The order of the baby's delivery is not mentioned. The name of the four brothers changes when the umbilical cord is cut to *I Mekahir, I Jelahir, I Selabir*, and *I Mokahir*, which probably indicates the influence of Islam on the naming system (Vickers, 1987).

When the navel has dried and fallen off , the four brothers change their names to *Anta, Preta, Kala, and Dengen.* The four brothers take care of the child until the time of

weaning, around two years of age. At this time the four brothers wander around, *Anta* or *Mekahir* goes South, *Preta* or *I Jelahir* East, *Kala* or *I Selabir* West, and *Dengen* or *I Mokahir* North. After about three years of wondering all of them turn to most powerful Demons, *Anta* to *Anggapati*, *Preta* to *Mrajapati*, *Kala* to *Banaspati*, and *Dengen* to *Banaspatiraja*. They live in and control all *tenget* or evil places and directions, day and night.

When the life period comes to an end the four brothers may be manifest in demonic or good characters, depending on how they are treated particularly during the life period. They are all guardians on the way to heaven, *Anggapati* turns to *Sang Suratma*, *Mrajapati* turns to *Sang Maha Kala*, *Banaspati* turns to *Sang Dorakala*, and *Banaspatiraja* turns to *Sang Jogormanik*. This is the time when the *putra* is supposed to take action to release his parent from hell. After the parent dies he will pass on a *titi ugal-agil*, the shaking bridge to heaven. The *putra* is reminding his parent of his four elder brothers,and at the same time the four elder brothers are asked to safe his parent. This is done by making an offering as part of *pitra yadnya* ceremony.

2.2.2. The body

The *Keputusan Sanghyang Punggung Tiwas* describes the contents of the body in more detail, resembling the anatomy of human organs. All internal organs, however, are symbolized by magical syllables and names of gods. So the *Dasaksara*, the ten syllables consists of: *sang, bang, tang, ing, nang, mang, sing, wang*, and *yang*. *Sang* is located in the heart and its god is Iswara, white; *nang* is in the lungs, its god is Misora, pink; *bang* is in the liver, its god is Brahma, red; *mang* is in the intestines and its god is Ludra, orange; *tang* is in the kidneys, its god is Mahadewa, yellow; *sing* is in the lymph nodes, and its god is Sangkara, green; *ang* is in the gall, its god is Wisnu, black; *wang* is in *ineban*, its god is Sambu, blue; *ing* is in the midliver, its god is Hyang Siwa, purple; *yang* is in the liverfold, its god is Hyang Guru, five mixed colours.

There are *Pancaksara* and *Caturaksara*, the five and four magical syllables. *Pancaksara*, the five magical syllables consists of: *ang, nang, mang, ong*, and *yang*. *Mang* is in the heart, its god is Iswara, white; *ang* is in the liver, its god is Brahma, red; *ong* is in the kidney, its god is Mahadewa, yellow; *ung* is in the gall, its god is Wisnu,

black; and *yang* is in *petumpukan hati*, the liverfold, its god is Siwa, five mixed colours. *Caturaksara* the four magical syllables consists of: *mang, ang, ong*, and *ung*. *Mang* is in the heart, its god is Iswara, white; *ang* is in the liver, its god is Brahma, red; *ong* is in the kidneys, its god is Mahadewa, yellow; and *ung* is in the gall, its god is Wisnu, black.

Triaksara, the three magical syllables consists of: *ang, ung*, and *mang*. *Ang* is in the liver, its god is Brahma, red symbolizing fire; *ung* is in the gall, its god is Wisnu, black symbolizing water; and *mang* is in the heart, its god is Iswara, white symbolizing wind or power. *Rhwa bhineda*, the two magical syllables consist of *ang* and *ah*. *Ang* is in the left eye's embodiment *tirtha kamandalu* and *ah* is in the right eye's embodiment *tirtha pawitra*. The single magical syllable is *ongkara* located in a midpoint between the left and right eyebrows; its god is *Sang Hyang Tunggal* or *Sang Hyang Taya* or *Sang Hyang Widhi Wasa*, the Balinese Almighty God.

2.3. Housing

2.3.1. Building a house

It is expected that a newly married couple should build a house to live in. This may be a complete compound, but at first could be only one building, enough to sleep in. Assuming that everything should be decided by the owner of the house, the following is the procedure to accomplish building a new housing compound. This includes selecting the site, the layout, and measurements applied to the buildings.

The layout of the buildings in the houseyard is based on the procedures written in the *lontar*[2] called *Asta Kosala Kosali*.[3] The arrangement of the houseyard is based on the philosophy of *Tri Hita Karana*, the balance between three elements, *parhyangan*, for the god, gods, and ancestors; *pawongan*, for the human beings; and *palemahan*, for the environs.

The location on which to build a new house is one of the procedures which should be

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[2]*Lontar* is a dried palm leaf where a written source is inscribed.

[3]*Asta* means measure, *Kosala* means lesson to build temple, *Kosali* means lesson to build house. This also contains guidance to construct the cremation tower *wadah or bade* (Tonjaya, 1982).

taken into account, because it will influence the future of the owner of the house. Besides, there are good and bad aspects of a site (Suandra, 1979).

Hayu, the safe, secure or good sites, include *karang menemu labha*, the site gathering wealth: this site is located at the west side of the main road, lower in the front and higher in the back yard; *paribhoga wredhi*, rich in food: this site is higher in the south and lower in the north side ; *madya*, plain: this site is plain but has nothing to block the view of the surroundings; *dewa ngukuhi*, fertile and bright: almost the same as *madya* but has a higher altitude than the surroundings; *sihing Kanti*, if the soil taken about 30 cm deep smells like hot chilli.

The *hala*, the unsafe, insecure or bad sites, include *teledu nginyah, sandang lawe*, and *kerubuhan*: site opposing the main road; *sula nyupi*, site which is circled by road; *kuta kubanda*, site which is located between two roads; *karang gerah*, site next to the main temples; *karang nemu baya*, a site creating a lonely feeling; *karang tenget*, a site which was used for shrines, cemetery, suicide or homicide; *karang bhuta salah wetu*, the site where sometimes strange events have taken place such as the birth of abnormal pigs or dogs; *panca baya*, site where a sudden smoke comes out, or inhabited by wild and dangerous bees.

There is always a possibility for those sites to be selected to build on by conducting certain ceremonies to prevent any bad effects or to get a good life for those who use the buildings. An example of these is the effort made by the government to remove cemeteries to be used for shopping centres. One of them is the Chinese cemetery formerly located at Balun and the other is at Tegal, both located in the centre of Denpasar city and relocated in sites outside the city.

As wood is the main material used for building frameworks, there are certain procedures which should be followed when cutting the trees. The good or bad effects depend on the direction in which the tree falls when it is cut. The good tree falls to east, north, north-west and north-east. If it falls to *purwa* and *utara*, east and north, the owner of the house will be safe and rich; if it falls to *airsnya* and *neriti*, north-east and south-west, the owner will be secure and have a lot of food. Other directions will give bad effects: if it falls to *gneyan*, south-east, it can cause the household to be poor; if it falls to

daksina, south, the inhabitant will die young; if it falls to *wyabaya* and *pascima*, north-west and west, the owner of the house will be continually quarrelling.

There are good or bad aspects regarding the time chosen to build houses. In this case the time relates to *sasih*, the Balinese months. For a good result one should choose *sasih kasa*, the first month around July, *sasih kapat*, the fourth month around October, *sasih kelima*, the fifth month around November, *sasih kenem*, the sixth month around December, and *sasih kadasa*, the tenth month around April. The other months should be avoided because they can cause quarrelling, risk of dying and other dangerous and unexpected accidents.

2.3.2. Layout of the buildings

There are three main groups of buildings in a houseyard. These have different functions with the idea of maintaining the balance between the god and ancestors, human beings, and environment. These are called *tri hita karana*, the three elements in the macrocosmos consisting of: *parhyangan*, site of buildings for worshipping god and ancestors; *pawongan*, site of buildings for living human beings; and *palemahan*, site of buildings for other purposes. All buildings are laid out following the concept of *tri angga*, three parts of the body, consisting of *utama angga* or *luan* which is directed to the head, in this case north-east; *madya angga* or *tengah*, which is localized around the central area of the houseyard; and *nista angga* or *teben*, which is directed to the legs, in this case south-west.

2.3.2.1. *Parhyangan*

Parhyangan is the site of the household temple localized at the north-east side of the houseyard. It is separated from the housing compound by a wall which is smaller than the houseyard wall. The buildings inside *parhyangan* consists mainly of: 1. *Rong-tiga*, a building with three open niches for homage to ancestors, the left side for *Sang Hyang Pratma*, the right side for *Sang Hyang Siwatma*, and the centre for *Sang Hyang Atma*; 2. *Gedong Catu* for homage to Bhatara Sri, god of prosperity; 3. *Ratu Ngelurah* for homage to *Sang Panca Maha Bhuta*; 4. *Taksu* for homage to *Sang Kala Raja*; and 5. *Padmasana* for homage of *Ida Sang Hyang Widhi Wasa*, Almighty God.

There are buildings outside this site which also function as *parhyangan*. *Tugu karang* is

localized at the north-west or centre of the houseyard. If there is a baby in a household a small thing is placed in the bedroom above the head of the bed to keep things for the baby. This place is also used for homage to Rare Angon, the god who takes care of the baby. Two small shrines which function for homage to Bhatara Kala may also be located on both sides of the front gate of the houseyard. In the old type of housing compound the site for *parhyangan* is localized in a north-east room, while in the modern type it may be laid out on the last floor on the north-east side.

2.3.2.2. The housing compound

The housing compound is laid out at *madya angga*, around the centre of the houseyard. In general, the buildings of the housing compound are for sleeping, performing ceremonies, keeping valuable materials, etc.

Bale peturon, building for sleeping is also called *meten* or *bale daja* to indicate the location at the northern side. This functions as the bedroom for parents or for a new married couple temporarily during the first few days and for keeping valuable materials. This building may have eight pillars, called *sakutus* or twelve pillars, called *sakaroras*. It is laid out eleven feet and one cross foot from the wall of the household temple, and seven feet and one cross foot to the north side wall of the houseyard.

Bale dauh, building at the west side of the houseyard. This building functions as dining room, guest room, bedroom for unmarried members of the family. It is seven feet and one cross foot from *bale peturon*. The size could be *sakenem* for six pillars or *sakalima* for a building with five pillars . At the same distance to *bale peturon* a building is laid out at the southern side of the houseyard, the *bale delod*. Facing to the north this building is used for performing ceremonies, to keep temporarily the dead, as an alternative bedroom, and place of other activities of the household. The size of this building is six pillars or nine pillars. There is another building *bale dangin* which is laid out at the east side of the houseyard. This building can have the function of alternative bedroom and for the storage of the family property. Facing to the west it is seven feet and one cross foot from *bale delod*. The size of this building is of twelve pillars, hence it is also called *bale gede*, large house.

Kitchen, granary and well are also included in *madya angga*. Where tap water has not

been available, water is usually taken from a well. The place of the well as the source of water in a household can be localized at the north-west corner or south-west corner of the houseyard. If a well is not available, getting water from other sources is usually time-consuming. The kitchen is usually supplied with a partly open roof which functions as the way out for the smoke since there are no chimneys in Bali. A cupboard is used to keep spices or cooked food and one *gebeh* is used as a water reservoir. Besides being the place for cooking, the kitchen also reflects the number of households in a houseyard. If there are more than one household, each household will either *ngerob*, share, or build another kitchen or take turns for cooking.

2.3.2.3. Buildings for other purposes

Other buildings laid out to the leg direction or *teben* in the houseyard are categorized as *nista angga*. These include bathroom and toilet, and buildings for keeping animals, most commonly pigs. More recently the government has encouraged families to raise chickens, quail, rabbits, etc., for family income generation. All shelters for animals are grouped in *nista angga*.

2.3.3. The houseyard wall

There is usually a wall built surrounding a houseyard. It is commonly laid out in rectangular form with four corners functioning as the hands to hold the wall. Each corner has a different name: the north-east corner is *sri*, the south-east is *aji*, the south-west is *rudra*, and the north-west is *kala* (Tonjaya, 1982: 18). The wall can be made from brick, stone, bamboo, etc. If the wall is made from mud, it is usually covered on the top with a kind of grass or palm leaves to protect the wall from erosion. There is usually one front gate located differently depending on the direction facing the houseyard.

To locate the front gate, *kori*, of the houseyard the length of the wall is first divided equally into nine parts. Then the nine parts are counted from the north-east corner if the houseyard faces east, from the south-east corner if it faces south, from the south-west if it faces west, and from the north-west if it faces north. The good or bad effect of the front gate on the inhabitant of the houseyard depends on the position of the front gate at any portion of the wall and facing direction of the houseyard.

If the houseyard faces east, the position of the front gate will result in the following:

first part *baya agung*, great danger of infertility; second part *musuh akueh*, lots of enemies; third part *kegeringan*, risk of sickness; fourth part *koos*, poor; fifth part *kinabakten*, lots of friends; sixth part *kasih perih*, no way for beggars; seventh part *suka laba rahayu*, prosperous, wealth, safe ,secure; eighth part *gering karogan*, continuous and various sickness; and ninth part *kepatihan*, early death. Thus, in this case the most ideal location of the front gate is at the seventh portion of nine.

If the houseyard faces south, the position of the front gate will result in the following: first part *baya agung* great danger of infertility; second part *musuh akueh*, lots of enemies; third part *suka mageng*, joyful; fourth part *brahmastaka*, quarrelling; fifth part *dana werdi*, honest; sixth part *sugih baya*, wealth but risk of bad accident; seventh part *tan werdi*, bad luck; eighth part *ala kepaten*, early death; and ninth part *kegeringan*, sickness. Thus the best position for the front gate is either the third or fifth portion of nine.

If the houseyard faces west, the position of the front gate will result in the following: first part *baya agung*, great danger of infertility; second part *musuh akueh*, lots of enemies; third part *werdi mas*, rich; fourth part *werdi guna*, clever; fifth part *denawan*, occupied by demons; sixth part *brahmastaka*, quarrelling; seventh part *kinabakten*, lots of friends; eighth part *koos*, poor; and ninth *karogan*, suffers from continuous sickness. Thus the best position of the front gate could be chosen from the third, fourth or seventh portions of nine.

If the houseyard faces north, the position of the front gate will result in the following: first part *tanpaanak*, no child; second part *kewikaran*, lots of trouble from neighbours; third part *nohan*, short of food; fourth part *kedalih*, victim of lawlessness; fifth part *brahmastaka*, quarrelling; sixth part *piutangan*, lots of debt; seventh part *suka mageng*, lots of joy; eighth part *kawisesan*, clever; and ninth part *kawigenan*, trouble of sickness. Either the seventh or the eighth portion is good to choose for the front gate location.

2.3.4. The traditional measurement

Ideally the measurement used to measure distance and size of any building in a houseyard is based on the size of the head of the family. The most common parts of the body used for measurement are finger, arm, hand, foot and leg. The measurements using finger and arm from smallest size are *guli madu, nyari, guli, adnyana, gana, anggana, sigra pramana, brahmana sandi, and sangga.* There are also *dema, musti, lengkat, and cengkang*. Measurements using hand and foot are *asta, depa, depa asta, depa asta musti, tampak*, and *tampak ngandang*.

2.4. The concepts of causes and healing sickness

2.4.1. The concept of causes of diseases

Traditionally there are several concepts of the causes of diseases or sicknesses, including: 1. The gods or ancestors; 2. The bad spirits including black magic; 3. The four elder brothers, *kanda empat*, including the instruments used to aid birth; 4. The *kala*, the wrong time; 5. Others include improper housing, improper offerings or performance of ceremonies of *panca yadnya*, and so on.

The concept of gods as the cause of disease is associated with the belief that a certain location or direction is the place of gods. For example, the mountains such as Agung, Batur, and Batukaru, all have gods and they are worshipped by the people. Every direction also has a god. Thus the gods of Nawa Sanga, the nine gods in all directions, are: 1. God Iswara resides in *purwa*, east; 2. God Mahesora resides in *gneyan*, south-east; 3. God Brahma resides in *daksina*, south; 4. God Rudra resides in *nairiti*, south-west; 5. God Mahadewa resides in *pascima*, west; 6. God Sankara resides in *wayabya*, north-west; 7. God Wisnu resides in *utara*, north; 8. God Sambu resides in *aisanya*, north-east; and 9. God Siwa resides in the centre.

It is believed that if a person is nominated to be responsible to carry out ceremonies on behalf of the god he must be purified. At first he is seen as behaving abnormally which stimulates the family to consult the senior traditional healers. The senior traditional healers then recommend the family of the sick person to perform ceremonies for the purification and then he becomes a *dasaran*, the conductor of the god, and he is usually

called Jero Dasaran and has high status, similar to Brahman in his community. Several taboos are usually applied to him: his sleeping place should be *luan*, the head direction, the clothes to be worn usually white, the food is subject to some restrictions of certain meats particularly of four-legged animals, and he may not pass under unclean materials such as underwear.

Ancestors are also believed to be able to cause sickness. This is usually associated with the neglect of the family to perform ceremonies for the ancestors, such as to build shrines where the ancestors are worshipped; or failure to conduct the *pitra yadnya* ceremonies to the unclean ancestors such the *pengabenan*, the cremation ceremony. It is believed that until eleven days after birth a baby is still accompanied by the ancestors. During this period he is not exposed to diseases caused by the environment, so if he is sick the cause is hereditary factors, in this case the ancestors who accompany him to birth. The ancestors will leave him on the eleventh day after birth and after that any diseases or sickness could be caused by post-natal factors such as the instruments used at birth (Tjateng, 1979).

Balinese believe in bad spirits both in nature and man-made. In nature they are believed to live in forests, steep rocks, rivers, cemeteries, and other places. They have several names such as *tonya*, *memedi*, and the demonic characters of the four elder brothers, *kanda empat*. The other fearsome bad spirit is *bebai*, which is believed to be able to enter more easily the body of an unstable person such as one in his adolescence. A *Leyak*, is believed to be a person who is able to transform himself to the most common bad spirit, by a special magical formula. This can be in the form of a monkey, pig or even bicycle, car, or cremation tower and always at night time. Both the natural and man-made bad spirits are believed to deadly dangerous particularly to children and weak persons.

The four elder brothers can turn to the most powerful demonic characters. The first who originates from the amniotic fluid is Anggapati: the sign of his presence is when the sky is clear of all clouds or if at night one can see a *kulkul*, the drum tower, standing in the middle of the road. The second who originates from the blood is Merajapati, who governs all journeying from place to place: the sign of his presence is spreading fire on the ground or the appearance of a mountain or forest. The third brother, who originates from the *vernix caseosa*, is Banaspati: his presence is signalled by a strong wind or a wall

across the road or a house standing in the midle of the road. The fourth who originates anamfrom the placenta is Banaspati Raja: his presence is manifested in various signs like a bird, falling rain or stream (Mershon, 1970: 57). If a child finds those characters he may be very frightened and sick. However, a person who knows how to 'talk' to them may be saved with their help.

The instrumental aids used at birth, such as the *engad* (bamboo blade), ash, coconut oil, green leaves of the *dapdap* tree, salt, candlenuts, turmeric, the coconut shell, and the black palm fibres are all able to cause sickness to the child. If the bamboo cutter called I Lisah causes sickness a pain will be felt all over the body and sleep is impossible; if the salt called I Garem causes the sickness the child will suffer from stomatitis; if the candlenut called Sang Tik Maya causes the sickness the child will suffer from swelling; if the turmeric called Sang Kamajaya causes the sickness the child will suffer from trouble in defaecation; if the black palm fibres called I Buta Breganjong cause the sickness the child may suffer from various types of symptoms such as whooping cough, convulsions, fear; and if the coconut oil causes the sickness the child will suffer from diarrhoea.

Certain points of time are considered dangerous by Balinese. The most common times are *tengahi tepet*, midday and *sandi kala*, sunset time. At those times children are not allowed to play outside the houseyard. If they do the parents will look for them and take them home. If somebody wants to travel and the time is about midday he is usually requested to wait until midday has passed. Staying outside at those times is particularly dangerous for children because of the influence of bad spirits or demons. There is still a belief that if a child stays outside the houseyard at those times he may be stolen by the demons and placed in an isolated location hard to find, such as in the bush or graveyard. The ordinary person will not see him even if he is very close and the child just does not want to talk. Only after an offering is made and accompanied with noisy instruments with a gong will the people easily spot the child and take him home.

The *Wariga Kerimping* (Supartha) describes particular days or *wukus* in which certain works could cause ill health to children. In the *wuku* Sinta on Saturday and Tuesday, for example, there is what is known as *karnasula* in which an opening ceremony for a building for sleeping may not be conducted since it may cause deafness to the children. In *wuku* Ukir on Tuesday and Wednesday there is *inkel wong sadina*, when cutting hair is

not allowed because it can cause blindness and baldness. In *wuku* Tolu on Friday and Tuesday there is *kala gotongan*: if a member of a family dies he may not be buried on those days because another member of the family may also die very soon.

The *Keputusan Sanghyang Tiwas* describes *sasihs*, the Balinese months, which are associated with the gods who are responsible for the cause of endemicity of diseases. In *kasa*, the first month, around July is god Sang Hyang Wirakusuma; in *karo*, the second month, around August is god Ratningrat; in *ketiga*, the third month, around September is god Jagatpati; in *kapat*, the fourth month, around October is god Kusumajati; in *kelima*, the fifth month, around November is god Jagatkarana; in *kenem and kepitu*, the sixth and seventh months, around December and January is god Sada; in *kewolu*, the eighth month, around February is god Durga; in *kesanga, kedasa, jiesta, and sada*, the ninth to twelfth months, around March to June is god Ageni. The diseases suffered by the people are various depending on the *sasih*, but in general consist of fever, headache, nausea, vomiting and diarrhoea.

There are other concepts of the cause of diseases. These include improper procedure in building houses, such as the timing, site, the layout, the measurement, the kind of wood used; and improper procedure conducting *panca yadnya*.

2.4.2. The concept of treating diseases

The treatment of sickness is usually associated with *balian*, the traditional healers and *usada*, the traditional medicine manuals which are prescribed on a *lontar*.

Treating a patient should take into consideration, if possible, all factors associated with the sickness of the patient. A traditional healer should never forget to pray for the blessing of God and guidance from the ancestors by conducting the offerings and reciting *mantram*, the holy words with special magical formulas. The healer himself must have responsibility and credibility as a healer. He may not, for example, be conceited such as to make a statement that a kind of illness can be cured easily or deliberately recommend the patient to come for consultation on the grounds of business reasons or even to give treatment to a dying person. If he does so he will not be trusted as a healer any more, or there will be a risk of a sudden death because the curse of the God or the ancestors.

The *Usada Buda Kecapi* describes Sang Hyang Tiga, the Three Gods, Brahma, Wisnu, and Siwa as having the roles of both the cause and healer of an illness. As a healer the three gods become one, *Sang Hyang Tiga Swari*, God Brahma as the source of food cures the illness with cold, God Wisnu as the source of power cures the illness with fever, and God Siwa as the source of life cures all other forms of sickness.

The *balians* themselves can be grouped depending on the methods used for the treatment into three: 1. *Balian ketakson*, the traditional healers who use the trance as the method for treatment. The trance itself is also used to 'diagnose' the sickness before a proper treatment may be given to the sick person. They have several names such as *Jero Dasaran*, *Balian sonteng*, and *Balian tapakan*; 2. *Balian usada*, the traditional healers who use the *lontar* as the manual for treatment. There are many kinds of these traditional healers such as *usada tuwa*, for the aged, *usada rare*, for children, *usada tenung*, for traditional healers using the forecast, and so on; 3. Other *balian*, who use mostly skill rather than the methods mentioned before. This includes traditional healers for birth attendance, massage, and fracture.

Trance as a method of treating a sick person is performed in a ceremony called *ngerauhang*, the invitation of the gods or ancestors to come down to the world through a trance *balian*. In the ceremony a group of senior *dasaran* are invited. They sit facing the offerings and cover themselves with white garments. The eldest in the family of the sick person sits behind or beside them. He speaks high words to invite the gods to descend for the sake of the sick person. After a long talk one by one the *dasarans* diagstart to go into a trance. At first the body of the *dasaran* is vibrating, then follows a conversation between the god and the eldest person. Next the ancestors usually come with the permission of the god and everything about the sick person is discussed. After the family of the sick person is satisfied the ancestor asks permission to come back to heaven followed by the return of the god. The family of the sick person soon follows whatever the ancestors and the gods told the family. After everything has been fulfilled the sick person is to be a new *Jero Dasaran*.

The healing of the sick person depends very much on his condition. Although generally the people believe that the sick person can be helped by this method, certain cases could result differently. One day in 1979 a family performed this kind of offering. I attended

the ceremony and found that the sick person was suffering from a chronic ear infection with a complication of mastoiditis. Her condition was very bad with a temperature of 40 degrees centigrade. I offered a medication with antibiotic which must be injected because she could not drink. Unfortunately the family of the sick person would not accept treatment until the ceremony had lasted three days. Early the next morning somebody knocked on the door, saying that she had died. This happened in an upland village of Kintamani subdistrict.

The belief in the traditional healers is found not only in the villages but also in the cities. One day a husband took his wife to my private practice located in the city centre of Denpasar with an hypotensive shock (a shock from low blood pressure). The *anamnesis*, the interview for investigation, confirmed that she had taken an oral antibiotic about 30 minutes prior to the examination. Her systolic blood pressure dropped to 85 mHg and the pulse counted 135 a minute. I wanted to give her an intravenous antihypotensive medication, but both the wife and husband refused to accept it unless permission was given by their *guru*, the traditional healer who forebade them to have any kind of injection. I advised the husband to take his wife to the hospital right away. He again refused because he was afraid an injection would be given in the hospital, rather he asked me to drive them to their *guru* for permission. As there was no alternative, I drove them to their *guru*'s house. I asked the husband to hurry while I waited in the car and when he came back I took them to the hospital.

2.5. Ceremonies and naming system pertaining to Balinese children

2.5.1. Ceremonies in childhood

Ceremonies in the childhood period are part of *manusa yadnya*, the ceremony for human-being. Since the religious concept of physical human-being is started as soon as the fertilization between *kama bang* and *kama putih* takes place, any ceremonies performed after that are the *manusa yadnya* until the death of the person. However, the ceremonies described below are restricted to the childhood period up to adolescence.

2.5.1.1. Antenatal period

As soon as a woman is recognized to be pregnant, which is indicated by the symptoms of *ngidam*, morning sickness, such as nausea or vomiting particularly in the morning, certain taboos start to be observed by both the wife and husband. Both should control properly the three important aspects of *tri kaya parisuda*, *angen*, thought, *ucap*, speech, and *karya*, action.

When the wife suffers from *ngidam*, she usually wants something to eat and frequently these things are either too strange or very hard to find; but the husband will usually try to find them. Generally a *ngidam* wife likes to eat *rujak*, which is made from half-ripe mangoes or papayas mixed with salt, vinegar, coconut sugar, and ground dried fish or prawns. However, she is not allowed to eat certain fruits such as young pineapple because it is considered as abortifacient. She is also not allowed to work hard, and in certain villages she is probably not allowed to do work for offerings or enter the temples. The husband may wear his hair long until the birth of his child.

The first ceremony is performed during the first trimester of pregnancy which is called *megedong-gedongan*, the ceremony in a *gedong*, the room. This is performed to welcome the reincarnated person to the family, and also the right time to ask for the gender of the child. From the human biological point of view in fact this is the period when all of the body organs are formed including the sex organs.

2.5.1.2. Delivering baby

When the birth of a baby occurs, traditionally this is done indoors on the floor to protect both the mother and the baby from the danger of outdoor magical power. She is usually attended by a male traditional midwife who holds her from behind when the birth occurs.

As soon as the baby is born the umbilical cord is cut by using a sharp *engad*, the blade made from bamboo. When the cutting is done the umbilical cord is placed on a fresh turmeric. When it has been cut and bound, some traditional medicines are applied to stop the bleeding and to dry the umbilical cord. These consist of ash, salt, coconut oil, candlenut, and green *dapdap* tree leaves. When the placenta has come out it is handled with the right hand in order to keep the baby right handed. The placenta is washed free of blood and then put in a container or coconut shell which is called *beruk*. In certain

villages this is then hung in a tree in a special place called *pemerukan* such as found in Terunyan (Klungkung, 1979). Most people, however, bury the placenta in the houseyard at the front door of the house, at the right side for a boy and left side for a girl.

2.5.1.3. Postnatal period

Ceremonies are continually performed after birth at particular regular times. Most of them are small offerings, except the ones which are considered very important such as *nelu bulanin*, the three months offerings and *otonan*, the birthday. The small offerings include *kepus pungsed*, the fall of the umbilical cord, and *menek kelih*, the ceremony of adolescence.

During the first 42 days after birth neither the mother nor the child is expected to leave the houseyard. The mother is considered to be still unclean, while the baby is in great danger from bad spirits, demons, or black magic. On the 42nd day the ceremony of *tutug kambuhan*, the purification, is performed. After that the baby and the mother are allowed to leave the houseyard, but should continue to be careful. To remind the mother to take care of the baby, the following song is sung (Belo, 1970: 13).

Bibi anu lamun payu luwas manjus,
antenge tekekang,
yatnain ngaba mesui,
tiuk puntul bawang anggon sesikepan.

Anak liyu bencana di marga agung,
bajang ulu bukal,
mengisep nyonyo ngulanting,
mengetekul mekrana tanpesu empehan.

Sangkan itung tuyuhe mepala lacur,
ngulah betek basang,
rarene juwa ngemasin,
dadi lacur enyen anake selselang.

Mother whoever you are, when you go to bathe,
bind your breast tightly,
take care to bring *mesui*,
and a dull knife with onion as charm.

Lots of danger on the public road,
evil spirits in the form of flying foxes,
sucking the breasts,
silently hiding so that no milk comes out.

Take into account the trouble of a hard work,
although the belly is full,

the baby is to be the victim,
if he dies who should you blame?

The ceremony of *nelu bulanin* is performed on the 105th day after birth. At this time the hair of the child is cut, and it is given a name. Besides, it is exposed to the earth for the first time. Formerly the hair was cut in such a way that the hair covering the fontanelle was left growing, called *jambot*.

The main ceremony during childhood is the *otonan*, the birth day. This falls on the 210th day after birth and is celebrated regularly thereafter, but the biggest ceremony is the first one. The date could be different every time the birthday comes, but the *wuku*, which consists of 30, and the week-days will be exactly the same. So every Balinese will know the *wuku* and the day of his birthday but may not know the date, month and the year.

2.5.2. The naming system

A baby is not given a name before it reaches its 105th day. During this period it is called by a temporary name and is usually treated specifically. The word for the child is *I Dewa* or *I Ratu*, which means the god. In certain villages it may be called *barak*, the red, probably because of the reddish colour.

The naming system is unique to Bali. In general it can be used to indicate several things, including the gender, the birth order, and the caste.

2.5.2.1. The gender

The gender can be indicated in several ways; First, by the use of preposition **I** (pronounced 'ee') and **Ni** (pronounced 'nee'). The use of **I** is generally specific for males such as in **I** Gede Surya, while **Ni** is always for a female as in **Ni** Made Puri. Exceptions may be found in I Gusti Ayu and **I** Dewa Ayu, which indicate women; secondly, the use of the last character of the last name **a** (pronounced 'er') is usual for a male as in Jaya, while **i** (pronounced 'ee') is usual for a female as in Ari; thirdly, the use of Ayu (pronounced 'ahyou') always indicates female, while Bagus (pronounced 'bahgoose') always indicates a male.

2.5.2.2. The birth order

The birth order is indicated by the first name used up to the first four births. The first child has the first name of *Wayan*, *Putu* or *Gede*. *#+hWayan* means eldest, *Gede* means big. The second child uses the first name *Made* or *Nengah* which means middle; a modification of *Made* is *Kadek*. The third child uses the first name of *Nyoman* and the modification of this is *Komang*. The fourth child has the first name of *Ketut* which sometimes is interpreted as the rest of the births. If a family has more than four children the names of the next children either return to the first or are just *Ketut*.

2.5.2.3. The caste

The names can also indicate the caste of a person. The castes are grouped into four: the Brahmans, Ksatrya, Weisya, and Sudra. Ida is usually used by Brahmans, Dewa or Cokorda by Ksatrya, Gusti by Weisya. Sudras do not use a prefix to their name. There are other names which are difficult to group in a caste such as Ngakan, Sang, and Si.

Since intercaste marriage is now possible, the name of a child will follow the father's caste name system. However, there may be a change in the mother's name to *Jero* or *Mekel* followed preferably by the name of flowers such as *Sandat, Cempaka, Gadung, Ratna*, and *Puspa*.

2.6. Conclusion

A child has a very important place in a family both as a *santana*, the offspring who will continue the existence of the family and as *putra*, the saviour of the parents when they have died.

As a member of a family he is viewed as part of the elements of the *macrocosmos* which consists of three 'worlds', *parhyangan*, of the God and ancestors, *pawongan*, of the human beings, and *palemahan*, of others; and of the *microcosmos*, the interior 'world' of human-being.

His life is influenced by the customs and beliefs of the community such *Panca sradha*, the Five Principles of Belief consisting of the belief in God, belief in *Atman*, the soul, belief in Reincarnation, belief in *Karma phala*, and belief in *Moksha*. The ceremonies pertaining to the life of a child, the *manusa yadnya* conducted from the fertilization between *kama bang* and *kama putih*, take place until the death of the child.

Other factors with apparently important roles in the life, including the health, of the child include the components of housing; the concept of bad and good time, *dauh*, a particular time in a day, date, *wuku*, and *sasih*; the concept of the cause and method of treating diseases; and the position of the child in a family or community.

Chapter 3

The integrated family planning and nutrition program

3.1. Introduction

The Family Planning Programme was officially launched by the government about a decade ago, and since then some sample surveys and the last population census of 1980 have revealed that both the fertility rate and the infant mortality rate are continuously declining (Lembaga Demografi, FE-UI, 1973; Hull, Hull and Singarimbun, 1977; Central Bureau of Statistics, 1983). However, infant mortality is still 'staggeringly' high compared, for example, with those of some neighbouring countries (e.g. Singapore and Thailand). Consequently, more effort should be made to develop a just and evenly distributed welfare system for all people as one of the national development goals.

Meanwhile, the National Health Survey conducted in 1980 found that the major causes of diseases and deaths among children under five were infectious and parasitic diseases (Budiarso, 1983), which were mostly preventable. In addition, some health sample surveys conducted in West Java suggested that the incidence of low birth weight - defined as weight at birth of 2500 grams or less - was among the highest in South East Asian countries (Puffer, 1983), a factor more than any others believed to affect mortality, especially in the neonatal period. Moreover, the so called Malnutrition Morbidity Mortality (Tri M) complex has been identified as the most frequent cause of illness and deaths in early childhood, specifically up to five years of age. Paradoxically, and it is probable that the complex will lead to higher population growth in the long run, as a result of the reluctance of parents to practise birth control because of the high infant mortality rate (Clinton, 1979).

In response to the above problems the Ministry of Health and the Family Planning Coordinating Board (FPCB), with the assistance of the international agencies, particularly UNICEF and USAID, have implemented programs focusing on the

nutritional status of the vulnerable group consisting of children under five years of age, pregnant women, and lactating mothers. So far, however, the programs have been operating departmentally; it was felt that instead an integrated approach would be more efficient, so the FPCB with the assistance of USAID implemented a new extended program called *KB-Gizi Terpadu*, integrated Family Planning and Nutrition Programme, which is supported by other departments such as the Ministry of Health and the Department of Agriculture.

This was started in 1980 on Java and Bali and was financially supported up to the fifth year when it was hoped that the local communities would be able to change their behaviour in terms of their ability to develop the use of local resources to improve their nutritional status, health and welfare. In order to get feedback from the ongoing program, evaluations were proposed, one of which is used as the main data source in this thesis.

3.2. Some problems of population, health, and nutrition

3.2.1. The population growth rate

In Indonesia population problems seem to have been well recognized since the early 1950s, when a female physician broadcast on the use of birth control to women of reproductive age. Although adverse reactions came from various sides to oppose the broadcast, the ultimate result was to strengthen the movement to use birth control with the establishment of *PKBI, Perkumpulan Keluarga Berencana Indonesia*, the voluntary Indonesian Planned Parenthood Association, which was formed in 1957 and expanded its services in the difficult times of the early 1960s despite lack of government support. After the transfer of power to the New Order Government in 1966 the green light of acceptance of family planning was signalled by the readiness of President Soeharto to jointly sign the United Nations Declaration on Population with 29 other world leaders (Hull, Hull, and Singarimbun, 1977).

The awareness of population problems was enhanced when *LKBN (Lembaga Keluarga Berencana Nasional)*, the National Family Planning Institute, was established in October 1968 by presidential order. This then was transformed to *BKKBN (Badan Koordinasi Keluarga Berencana Nasional)*, the National Family Planning Coordinating Board, in

1970, as is described in detail in the Guidelines for State Policy in the Five-year Development Plan. This was the starting point of government-supported family planning as one of the methods to combat the population problems frequently cited in Indonesia, which include large population, high fertility rate, high mortality rate particularly of infants and children, high proportion in young age groups, high dependency ratio, and unbalanced distribution of the inhabitants between islands throughout the country. The population growth rate is a major facet of population problems, which are described in more detail below.

During the last two censuses it was found that the population growth rate of Indonesia increased from 2.1 per cent between 1961 and 1971 to 2.3 per cent between 1971 and 1980 (CBS, 1983). If all demographic characteristics remain unchanged, the population which was 148 million in 1980 can be expected to be 296 million by the year 2010[1](Table 3-1). With the limited resources and limited capacity to purchase even the basic demands such as *pangan* (food), *sandang* (clothes), and *papan* (house), the rapidly doubling population will undoubtedly endanger the results achieved by national development in improving the socioeconomic condition of the community.

It is hypothesized that there is a two-way interaction between fertility and infant mortality. Lowering fertility could be a powerful means of reducing child mortality, and vice versa (Berg, 1973; Taylor, 1983). An improvement in nutritional status will increase the survival of children. The greater the number of children to survive, the less likely are parents to suffer from not having children because of high infant and child mortality. Thus, in communities with high infant mortality quantity is more important, in that more children are needed mostly in reserve for when others die, whereas with low infant mortality quality is more important, because fewer are needed and parents can therefore give more emphasis to quality (health, better education, etc.).

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[1]This is obtained by using the equation:

$$Pn=Po(1+r)^n$$

where,

Pn=number of population in 1980
Po=number of population in 2010
r=the growth rate per year
n=number of years from Po to Pn

Table 3-1. Approximate number of years a population takes to double, triple, and quadruple in size, given specified rates of growth.

Annual % rates of growth (r)	Approximate number of years the population takes to: double	triple	quadrouple
0.5	139	220	278
0.7	99	158	199
1.0	70	111	139
1.2	58	92	116
1.5	47	74	93
1.7	41	65	83
2.0	35	55	70
2.2	32	51	64
2.5	28	45	56
2.7	26	42	52
3.0	24	38	47
3.2	22	35	44
3.5	21	32	41
3.7	19	31	38
4.0	18	28	35

Source: Palmore and Gardner, 1983.

3.2.2. National economic growth

The infant mortality rate, one of the demographic events frequently used as a socio-economic indicator, is still high in Indonesia; higher than among the neighbouring countries such as Singapore, Malaysia, Thailand, Philippines, Burma, and Sri Lanka (Table 3-2).

It has been believed that national economic growth leads to better nutrition and thus, to a decline in infant mortality. This is, however, based on several assumptions including: a national increase in per capita income means an increase in the income of the poor large and rapid enough to be of nutritional significance; increased income of the poor leads to an immediate and automatic increase in the amount the family spends on food; increases in food expenditure by the poor family leads to an improvement in nutrition; improved nutrition in the family means an improvement for the nutritionally vulnerable member of that family (Berg, 1973).

The corollary of this argument, however, is that there would be a spontaneous increase in Infant Mortality Rate (IMR) due to the fact of economic downturn in recent years when the national economic growth has fallen to about 2 per cent per annum, whereas in the past it was 6 per cent (Jones, 1987). However, it is clear that levels of economic development and rates of economic growth alone do not determine levels and trends of IMR. Burma, for example, with per capita GNP of US$ 190 in 1982 and a rather stagnant economy, experienced a decline in IMR as high as 58 per cent from 1960 to 1986, whereas Indonesia with per capita GNP of US$ 580 in 1982 and a more dynamic economy, experienced a decline in IMR of only 35 per cent in the same time period. Singapore on the other hand with a per capita GNP of US$ 5,910 and a very rapidly growing economy, experienced a decline in IMR as high as 75 per cent. So there is probably something else other than economic growth which influences the decline of IMR.

Table 3-2. Gross National Product, IMR, and Inflation Rate by countries and years.

Country	IMR			GNP		INFL.RATE
	1960	1982	1986	1982	1985	1980-1985
Singapore	36	11	9	5910	7420	3.1
Malaysia	73	29	27	1860	2000	3.1
Sri Lanka	70	39	34	320	380	14.7
Thailand	103	50	41	790	800	3.2
Philippines	80	50	46	820	580	19.3
Burma	153	00	64	190	190	2.6
Indonesia	139	90	76	580	530	10.7

Source: Grant, 1985, 1988.

3.2.3. Infant and child mortality

In countries like Indonesia, whose population composition is regarded as young, with more than 40 per cent of the population under 15 years of age (CBS, 1980), the vast majority of deaths affect infants and children. The endogenous[2] cause of deaths, which has a typically biological character and is resistant to scientific progress, includes

[2]Endogenous cause of deaths is presumed to arise from the genetic makeup of the individual and from the circumstances of prenatal life and the birth process.

mortality from such causes as the degenerative diseases of later life (such as heart disease, cancer, diabetes) and certain diseases peculiar to early infancy such as immaturity, birth injuries, postnatal asphyxia; it is less prominent than the exogenous[3] cause of deaths, which is relatively more preventable and treatable. Another important point is that low birth weight is mainly related to full-term pregnancy in contrast with developed countries, where it is usually related to immaturity.

As infant mortality rate is declining where the cause of death is shifting to endogenous causes, mortality distribution is more likely to concentrate in younger ages of infancy. In 1982, for example, among countries with IMR of 25 or less per 1000 live births, in Australia, with crude death rate (CDR) of 8 per 1000 population, the IMR was 10 per 1000 live births and the 1-4 years child death rate was less than 1 per 1000 children in that group; while among countries with IMR of 80 to 100 per 1000 live births, in Indonesia with CDR of 13 per 1000 population, the IMR was 90 per 1000 live births and the 1-4 years child death rate was 23 per 1000 children in that age group.

The National Household Health Survey conducted in 1980 found that IMR was 104.8 per 1000 live births while the 1-4 years child death rate was 19.6 per 1000 children in that age group. Of all deaths in infancy 40.3 per cent occurred in the neonatal (less than 1 month of age) period. Four leading causes of deaths in the neonatal period were: tetanus, injuries and difficulties associated with birth, upper and lower respiratory infection, and diarrhoea (Budiarso, 1983). Other surveys specifically dealing with low birth weight (LBW)[4] conducted in three groups in West Java found LBW less than 2500 grams was 8.9 per cent in 25 hospitals and clinics, 14.7 per cent in Ujung Berung, and 17.5 per cent at Hasan Sadikin Hospital in Bandung. The LBW in neighbouring countries between 1982 and 1985 ranged between 6 per cent in Australia and 25 per cent in Sri Lanka (Table 3-3).

It is important to recognize that LBW babies in poor communities were mostly of term-small-for-gestational-age (TSGA). It was found that LBW is highly significant in two

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[3]Exogenous cause of deaths is presumed to arise from purely environmental or external causes (Shryock and Siegel, 1976: 232)

[4]Low birth weight was defined as 2500 grams and less in the first World Health Assembly, but it was altered to less than 2500 grams in the Twenty-ninth World Health Assembly in 1976 (Puffer, 1983)

Table 3-3. Percentage of infants with low birth-weight by country and year.

Country	1979-1981	1982-1985
Australia	5.8	6
Singapore	11	8
Malaysia	9	10
Thailand	13	12
Philippines	20	18
Sri Lanka	21	25
Burma	20	20
Indonesia	18	14

Source: UNICEF, 1985 and 1988.

important respects: first, it is strongly conditioned by the health and nutritional status of the mother, in the sense that maternal nutritional status, ill-health and other deprivations are the most common causes of retarded foetal growth and/or prematurity as manifested in low birth weight. Secondly, it is universally and in all population groups, the single most important determinant of the chances of the newborn to survive and to experience healthy growth and development (UNICEF, 1985: 103).

3.2.4. Nutritional status

Although malnutrition has undoubtedly been one of the major health problems in Indonesia for a long time, like an iceberg it was largely hidden and its magnitude did not attract much community and government attention until 1974, when President Soeharto called upon 10 ministries to join a co-ordinated effort to improve the nutritional status of the population. The government effort is partly based on Sayogyo's findings on nutritional status: that one-half of Indonesian children suffered from malnutrition; that poverty and malnutrition were closely linked; that existing programs aimed at increasing protein consumption were largely irrelevant (Rohde and Hendrata, 1984: 253). The major identified nutritional problems includesupp protein and energy malnutrition (PEM); anaemia particularly caused by iron deficiency; vitamin A deficiency; and endemic goitres caused by iodine deficiency.

The previously existing small projects on nutrition such as those run through mother-and-child health (MCH) clinics proved to have several disadvantages including: most of those intended to use the food supplement provided do not attend the centres (MCH clinics) and therefore are excluded from the program; in general the community lacks nutritional knowledge; the target groups have not been indicated and selected properly; and lack of an appropriate organization involving personnel and elements of management structure. Besides, there have been other weaknesses in the small nutrition projects such as the lack of clear and specific objectives; lack of local community participation; and lack of appropriate operational procedures and monitoring and reporting system.

Aware of those problems and recognizing the complex causes of malnutrition, the government feels it would be more appropriate to conduct an integrated program involving several departments as follows:

The FPCB seems to fulfil the requirements to co-ordinate the new integrated program based on the successful achievements demonstrated in running the family planning program. These include a high level of political commitment, starting at the President of the Republic, and extending to all civil leaders and bureaucrats in all sectors; a strong communication strategy, exemplified in the recruitment of village workers for face-to-face communication, use of mass media, and the formation of acceptor clubs; a young flexible bureaucracy functioning as a co-ordinating unit among existing sectors. As a co-

ordinating unit, the FPCB must work with and through other departments, providing concise goals and actions for co-operative sectors; a high degree of community and local leadership responsibility in program planning, implementation, and evaluation; and an effective program information system working in both directions to hold the various levels together.

Other departments include the Department of Health which would provide the technical guidance and clinical backup; Department of Agriculture which could use the agricultural extension workers for intensified home gardening; Department of Religion which would actively seek social outreach through a religious-activities approach; and universities which could help in designing nutrition program studies and evaluations.

3.3. Rationale and objective of the program

There are certain reasons for conducting an integrated family planning and nutrition program. The programs of family planning, nutrition, maternal and child health, immunization and diarrhoeal disease control have the same target group of population: pregnant women, lactating mothers, and children under five years of age. They also use the same service departments such as the health centres and other extended health institutions and workers. The integrated program will be more efficient, since the goal is the same. The coverage of the program to reach and improve the health condition of mothers and children can be increased. The contraceptive acceptance rate will increase because the eligible couples supposedly have more opportunity to have healthier children. The community will have more access to various health and family planning programs.

The objective of the program is to achieve a faster decline of IMR, 1-4 years child death rate, and fertility rate in order to achieve the further goal of a small and prosperous family norm. The target groups in the population are: infants and 1-4 year old children, pregnant women, *in partu* women, lactating mothers, and women in eligible couples.

In order to be able to evaluate the progress of the program, certain target achievements have been proposed by the year 2000 as follows: life expectancy at birth to be at least 60 years; the highest level of IMR to be 40 per 1000 live births and the death rate of 1-4-year-old children to be 15 per 1000 children in the age group; the LBW should not be

higher than 7 per cent and the percentage of 3-year-old children weighing less than 11.5 kilograms should not be higher than 15 per cent; the illiteracy rate of women should not be higher than 25 per cent; the prevalence of diarrhoeal diseases should not be higher than 200 per 1000 population; the coverage of immunized children under 14 years of age should increase to 80 per cent; the coverage rate of trained birth attendants should increase to 80 per cent; and the coverage rate of safe drinking water should increase to 100 per cent.

3.4. The integrated program in Bali

The implementation of the Integrated Family Planning and Nutrition Programme in Bali was started in 1980. There are two interesting aspects: first, although from the administration point of view the FPCB seems to be more involved in the program, the chief of the program at the provincial level is the Head of the Department of Health; second, the program can probably be classified into two broad parts: the program implementation, and the studies dealing with the progress of the program. The first part involves certain service departments and the second the University of Udayana. A description of the program activities follows.

3.4.1. Specific objectives

While the general objective of the Bali IFPNP is similar to that at the national level, that is to internalize the change of behaviour in adopting a small and prosperous family norm, the specific objectives proposed are as follows:

3.4.1.1. To encourage community participation and promote the development of the program at the grass-roots level.

It is hoped that all members of the community will actively support the program. Those who have been trained as nutrition cadres should be able to be the motivators of the local community, hence a snowballing process can spread the program; as a result all of the nutritionally vulnerable group consisting of pregnant and lactating mothers, and children under five years of age should be covered.

3.4.1.2. To stimulate behavioural changes to improve nutritional status and family planning practices.

This will include encouraging mothers to breastfeed their children until the age of two years and to give children food supplements according to their growth and development; to remind families to give all children under five the worm drugs every six months and sugar solution or oralyte in the case of diarrhoea; to encourage pregnant and lactating mothers to eat one or two more plates of nutritious foods than is usual, and take one iron tablet every day during the lactating period and the third trimester of pregnancy; to refer high risk pregnant women to the closest health services centre; to encourage every family to use their houseyard for gardening to improve the nutritional status of the families; and to persuade all eligible couples to adopt family planning and to practise contraceptive methods.

3.4.1.3. To improve nutritional status of children

This includes making every effort to enable all children to increase their weight when they are attending the weighing post every month; making every effort to enable all children aged 36 months to achieve at least 11.5 kilograms of their body weight; to prevent night-blindness and give treatment to children suffering from it.

3.4.2. Organization and function

The principles used for constructing the organization are based on the assumption that all people who hold position in the organization can function dynamically; besides, the program should be supported by all individuals, groups, and institutions in the community. To meet these principles certain departments are given positions as the core mobilizers and others as supporters of the program. The core mobilizers consist of the FPCB, Department of Health, Department of Agriculture, Department of Religion, and University of Udayana. The structure of the organization is different at every level of administration as follows.

3.4.2.1. Provincial level

At the provincial level a Supervisory Team is formed and consists of the following personnel:

```
Chief          : Head of the Provincial Department
                   of Health.
Vice Chief I   : Head of the Provincial Family
                   Planning Coordinating Board.
Vice Chief II  : Dean of Faculty of Medicine,
                   Udayana University.
Secretary      : One of the staff of Provincial FPCB.
Members        : One each from Department of Health,
                   FPCB, Department of Agriculture,
                   Faculty of Medicine. The Department
                   of Religion helps in approaches to
                   motivate the local community.
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Their main functions are to take responsibility for planning, monitoring, and evaluating the progress and result of the program; to arrange regular meetings to discuss any new issues both from Central Government and from the feedback of the program; to supervise the program at lower levels; to make regular reports to Central FPCB, Department of Health, Department of Agriculture both at the national and provincial levels.

3.4.2.2. *Kabupaten* or Regional level

A team which plays the role of the communicator between organizations at provincial and lower levels is formed at *Kabupaten* level and consists of the following personnel:

```
Chief    : Head of the Regional Family Planning
             Coordinating Board.
Members  : Head of the Regional Department of
           Health, Head of Regional Department
           of Agriculture. The Family Planning
           Field workers who are taken from the
           Family Nutrition Improvement Board play
           the role of communicating  between
           departmental activities.
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Their main functions are: to implement programs formulated at the provincial level; to construct a time table of activities and supervision; to make a report to the provincial team for the next meeting; and other activities dealing with the implementation of the program.

3.4.2.3. *Kecamatan* or District and lower levels

The personnel at *Kecamatan* level play the role of communicating between departments at *Kecamatan* level and *Kabupaten* level. The schedule of plan of action is made by a team consisting of Head of the Health Centre, Staff of District Agriculture Department and the Programme Communicator. At the village level the family planning field workers supervise the nutrition cadres, and at the *banjar* or hamlet level, the program is run by the nutrition cadres.

Their main functions at these levels are: to arrange monthly activities; to handle referral patients sent by cadres and to send the patients back to cadres for further observation; to advise families on using their houseyard to improve the nutritional status of the families; to receive, manage and distribute material and facilities associated with running the program; to send monthly reports to the *Kabupaten* team. This is the responsibility of the communicator at *Kecamatan* level.

3.4.3. The program implementation components

As the target population to be covered was the whole population, priority was given to all children under five years of age, pregnant women and lactating mothers. In the first year, the program covered the population in 231 *banjars*,a ratio of one family planning field worker for one *banjar*. Every year the program was extended but with the number of the family planning field workers (FPFWs) remaining the same. It would be one FPFW for every three *banjar* in the second year, one for every five in the third year, one for every 10 in the fourth year and one for every 16 in the fifth year of the program. The program components to be implemented were as follows:

3.4.3.1. Training and orientation

The program implementation in the field was initiated with training and orientation conducted to: 440 nutrition cadres; 231 FPFWs; 51 Programme Communicators at district level; 51 Nutrition Personnel at District level; 8 Heads of Regional Family Planning Coordinating Board; 8 Program Communicators at Regional level; 51 Personnel from Department of Agriculture at District level; 156 midwives; 50 Heads of Health Centres; 8 Heads of Regional Departments of Health; 8 Nutrition Coordinators at Regional level; 8 Personnel from Department of Agriculture at Regional level.

3.4.3.2. Conducting baseline data survey

Conducting baseline data collection was done by the University of Udayana. Two studies were conducted by the Population Studies Centre, Udayana University and others by the Department of Public Health, Faculty of Medicine, Udayana University.

3.4.3.3. Growth monitoring and health services

Performing child growth monitoring by weighing activities was done monthly by the nutrition cadres and supervised by the FPFWs. Conducting the health services included the distribution of high dose (200,000 IU) vitamin A every six months to children under five; the distribution of iron tablets to pregnant women, one every day during the last trimester of the pregnancy; the distribution of oralyte to children suffering from diarrhoea, and worm drugs to children suffering from worm infestation; to refer patients to the closest Health Services Centre; to give people nutrition education; to give food supplements and communal meals to children under five at the weighing post.

3.4.3.4. Promoting the use of houseyard for improving the nutritional status of the families

This includes planting vegetables, fruits, and flowers; breeding animals such as pigs, chickens, ducks, quail, honey bees, eels and fresh water fish. Since this is mostly in the field of agriculture, the promotion is motivated primarily by personnel from the Department of Agriculture, including the preparation of the new hybrids, care, harvesting, and even marketing.

3.4.3.5. Intensifying family planning practices

During the activities of the program such as the weighing post, the mothers and the couples of reproductive age are encouraged to practise contraceptive methods. If the mothers are not available at the weighing post the information on family planning is given to the adults in charge of the children, hoping they will pass it on to the reproductive age members of the family.

3.4.3.6. The use of mass media

Included in the activities is the use of mass media to spread any information regarding the program; for example, the use of radio and television which is programmed alternately between the FPCB, Department of Health, Department of Agriculture, and Department of Religion. The use of other media such as puppet shows and folk dances has proved to be working very well.

3.4.4. The evaluation survey on 1985 IFPNP

Surveys conducted in relation to the IFPNP can be regarded as the 'other side of the coin' of the program. The idea is that these should be used as 'laboratory' tools to investigate both the impeding and accelerating key variables. The acceptance and use of any findings even if these are scientifically sound depend on many factors: the personnel involved including the provider and the receiver; facilities provided including money, material, transportation, and instruments; methods used to implement the programs, etc. The findings from two surveys, the baseline data 1980 conducted by the Population Studies Centre,Udayana University and the mid-term evaluation 1982 conducted by the Department of Public Health, Faculty of Medicine, Udayana University, are presented followed by the description of the evaluation survey on the IFPNP 1985 which was also conducted by the Population Studies Centre.

3.4.4.1. Findings from the baseline data 1980

The baseline data on IPFNP were collected just before the program started in April 1980. This covered households of pregnant and lactating mothers in 78 *banjar* all over Bali. In each *banjar* 16 households were selected, divided evenly between households of pregnant and lactating mothers. In the case of a mother found to be both pregnant and lactating she was categorized as pregnant. Information was collected on the pregnant women, lactating mothers, and children under five years of age living in the selected households.

The methods of data collection used were: questionnaires; anthropometric measurements of the weight, height, and upper arm circumferences of children under five; stool collection for worm examination from children under five; blood collection for haemoglobin examination from mothers. All information was collected by visiting the

households. Data analysis was done partly manually and partly by computer for frequency tables.

The Harvard Standard reference of weight for age was used, where nutritional status is interpreted as severe malnutrition for those who are at least 60 per cent lower than standard, mild malnutrition for those between 60 per cent and up to 80 per cent of the standard, and well-nourished children for those more than 80 per cent of the standard. It was found that the nutritional status of children under five was: severe malnutrition 3.1 per cent, mild malnutrition 31.0 per cent, and well nourished 65.9 per cent. The age incidence of severe malnutrition is highest (3.87 per cent) at the age of 2 years and lowest (2.76 per cent) at the age of 0 years. The sex incidence of severe malnutrition shows that girls suffered more than boys in all age groups (Table 3-4).

The method used to indicate a mother suffering from anaemic disease was based on blood examination. This was carried out by a senior nurse working at the closest health centre, by visiting the mother in her house and using a Sahli instrument. The average haemoglobin level was 9.7 grams per 100 ml for pregnant women and 10.1 grams per 100 ml for lactating mothers. The prevalence rate of anaemia - defined as haemoglobin level less than 10.0 grams per 100 ml - was 57.2 per cent for pregnant women and 43.7 per cent for lactating mothers. There was not much difference in haemoglobin level according to gestational period of the pregnant women, while among lactating mothers the haemoglobin level tends to increase with the age of the breastfed children, reaching a peak at the age group 24-30 months, then decreases thereafter.

The percentage of women ever using contraceptive methods was 45 per cent, but those who were currently using was only 1 per cent. This was very low, probably because of some methods such as Norplant and traditional methods were not included, and the condom and vasectomy were not separately specified in the 1980 IFPNP survey. The percentage of ever using women increased with the increase of age groups reaching the maximum of 52.5 per cent in the 35-39 years age group and decreasing thereafter. The contraceptions ever used from all methods were: IUD 78.4 per cent, pill 26.8 per cent, sterilization 4.9 per cent, injection 1.2 per cent, and vaginal tablet 0.7 per cent.

Table 3.4. Nutritional status (%) (weight for height) of children under five by sex, nutritional status and age, baseline data, Bali 1980.

Age (yrs)	Males			Females			Males+females			
	W	M	S	W	M	S	W	M	S	N
0	85.1	13.6	1.3	82.1	13.6	4.3	83.6	13.6	2.8	470
1	66.7	31.8	1.8	53.7	41.8	4.5	60.4	36.5	3.1	424
2	67.7	29.7	2.6	52.2	42.6	5.2	60.0	36.1	3.9	310
3	63.9	33.6	2.5	54.6	42.4	3.0	59.1	38.2	2.7	254
4	63.0	34.2	2.8	45.6	51.5	2.9	54.5	42.7	2.8	211

Note: W= well-nourished
M= mild malnutrition
S= severe malnutrition
Source: Suryadhi, 1982: 32-37.

3.4.4.2. Findings from mid-term evaluation 1982

The mid-term evaluation conducted in 1982 was aimed at evaluating the progress of the program, specifically in planning and implementation of the program. The components of the program evaluated include: interdepartmental co-ordination; budget allocation, establishment and development of nutrition posts; training; supervision; recording and reporting system; the effectiveness and efficiency of program activities at the nutrition posts; the roles of the FPFWs especially in supervising cadres; and the participation of the community in the program (Wirawan, Gunung and Suryadhi, 1982).

The survey was conducted in 24 *banjar* scattered all over Bali. These are located in eight districts from four regions out of the total eight. The methods used to collect the data included interviews using questionnaires, observation of the program activities conducted at the nutrition posts, and analysis of the secondary data filed by the program conductors. The interviews were taken from the providers of the program at the provincial level to the *banjar* level.

The findings can be summarized as follows. In general the planning of the program was done quite well although some improvement was needed in the preparation; some improvement was needed in co-ordination, where FPCB staff were likely to be more involved in the activities; the flow of budget allocation was good; excellent achievement was found in the establishment and development of the program implementation; there was a need for improvement in effectiveness and efficiency of conducting the program at the nutrition posts, including need for better supervision; only 47.0 per cent of all children aged under five participated in the weighing post during the period of one year; 2.9 per cent of children under five suffered from severe malnutrition (Table 3-5); and the attendance of children at weighing posts was slightly higher in *banjar* which started the program in the second year than those of the first year.

3.4.4.3. Evaluation of FPNP 1985

When the draft scope of work for conducting the IFPNP was proposed by FBCB working jointly with USAID under the grant project number 497-0305, it was planned to conduct the IFPNP for five years starting in 1980. After the fifth year of the program, evaluation was to be conducted aiming among other things at finding the impact of the program on prevalence of protein and energy malnutrition (PEM) among children under five years of age; prevalence of untreated diarrhoea among children under five years of age; and prevalence of contraceptive users among the eligible couples.

The survey was conducted at the same *banjar* of the baseline data 1980, but the respondents and the number of households were different. In this survey the households were classified into pregnant women, lactating women, and neither pregnant nor lactating women, living in the households. It was decided that the number of households of pregnant women and lactating mothers would be 12 in every *banjar*, taken proportionally to the total number of pregnant women and lactating mothers in the *banjar*. A woman

Table 3-5. Percentage of children under five attending weighing post by nutritional status, Mid-term Evaluation, Bali, 1982.

Nutritional status	Attending the weighing post			
	Yes	No	Total %	N
Wellnourished	71.0	59.7	68.7	233
Mild malnutr.	26.4	35.8	28.3	96
Severe malnutr.	2.6	4.5	2.9	10

Source : Wirawan et al., 1982: 176.

both pregnant and lactating was categorized as pregnant. The women neither pregnant nor lactating included those who were unmarried. Only one respondent was to be taken in a household. The method used to select both the household and the respondent in the household was random sampling. All children living in the selected household were used as the informants for the nutritional status and health of children.

The main instruments used to collect the data were: questionnaires; instruments for measuring weight and height of children under five; and blood collection from the respondents. Observations were used to collect some information on health sanitation around the houseyard, knowledge and practice of health and nutrition. Except for the blood examination which was done at the clinical laboratory of the Central General Hospital in Denpasar, all activities were conducted at the respondent's house.

The data collected in this survey included the household composition; birth, marriage, and pregnancy history of eligible women; knowledge and practice of family planning, health, and nutrition; sickness of children; the socio-economic status of the household; and mortality. Besides, anthropometric measurements were taken for weight and height of children under five, and blood was collected from the respondents by both the Sahli and spectrophotometric methods.

3.5. Conclusion

The awareness of population problems in Indonesia has been reflected by the implementation of various government-supported programs aimed at increasing the quality of life of the people. The first step is to decrease morbidity, IMR, birth rate, and population growth rate. In turn these would prolong life expectancy and increase the proportion of people participating in the production process. Besides, the outcome of the national development can be maximized for people's welfare. To achieve these aims, certain targets have been established such as to achieve IMR lower than 40 per 1000 live birth and life expectancy at birth higher than 60 years by the year 2000, and the birth rate around 20 per 1000 population by the year 1990.

Based on the assumption that the child mortality rate and birth rate work in a two-way interaction, where a lower child mortality rate is likely to motivate the parents to have fewer but healthier children, better health of children also means a slower growth of population. For this reason the government places emphasis on improving infant and child health by implementing nutrition services through the management of FPCB working jointly with other service departments and financially assisted by USAID. The program is called *KB-gizi terpadu*, integrated family planning and nutrition program.

Surveys including evaluation of the impact of the program in Bali were conducted by Udayana University, specifically the Population Studies Centre and the Department of Public Health. Since the methods of collecting the data are different between University and FPCB, the result of analysis such as the assessment of child nutritional status may not be compared between the two sources.

Chapter 4
Children's nutritional status

4.1. Introduction

Evidence of the strong relationship between nutritional status and the quality of human populations (Population Reference Bureau, 1973) has drawn the attention of the government of Indonesia towards reinforcing programs dealing with the improvement of nutritional status in the community. On the basis of the remarkable success achieved by the Family Planning Programme in the previous decade, specifically in decreasing the birth rate and increasing family planning acceptance among the reproductive-age population, the overall responsibility has been given to the Family Planning Co-ordinating Board (FPCB) for co-ordinating an integrated family planning and health services program which covers five major areas: nutrition, family planning, immunization, diarrhoeal disease management, and mother-child health care.

Supported by USAID's Village Family Planning and Mother-Child Welfare Project initiated in 1979, the FPCB has implemented the program in collaboration with the Department of Health, Department of Agriculture, Department of Religious Affairs, and local universities. Except for the Universities, these Departments have been the core-body of the Family Nutrition Improvement Programme (UPGK) since 1974. This was a consolidation of the previous experience of the UNICEF-supported Applied Nutrition Program since 1963. Thus, the integrated family planning and health services program, in fact, is an expansion and reinforcement of the previous existing program, laying specific emphasis on improving nutritional status and health of children under five years of age, and lactating and pregnant women, as a precondition of the FPCB's objective of a small and prosperous family norm in achieving a better communities' standard of life.

In Bali this program operates through the *banjar*, a strong traditional community organization. In the first year of the program in 1980 it was planned to cover 213 *banjars*, then gradually increased until all *banjars* totalling around 3500 all over Bali

were covered in the fifth year of the program. As mentioned earlier under the auspices of FPCB, the Population Studies Centre of Udayana University conducted two studies: First, the baseline study in 1980, conducted just before the program started, and secondly the evaluation study in 1985. With the permission of FPCB, those data are used as the main source of analysis in this chapter to find any changes in the nutritional status of children under five years of age occurring during five years of the program.

4.2. The data

The data for both 1980 and 1985 were collected from the same 78 *banjars* all over Bali (Appendix A). These consist of 39 *banjars* in which program activities were implemented in the first year, and which thus are called program *banjar*, and 39 others, which were included in the following years, and are thus called non-program *banjar*. In 1980, 16 households of pregnant and lactating women with all of their children under five were selected equally from each *banjar*. In 1985, 18 households of reproductive age women were selected equally from each *banjar*. These consisted of 12 households of pregnant and lactating women and 6 households of neither pregnant nor lactating women including those who were still single.

Data cleaning was done at the Community Systems Foundation, Ann Arbor, Michigan, chaired by William D. Drake, Ph.D. In order to maintain the consistency of data categorization only those households of pregnant and lactating women with all of their children under five years of age in 1985 were used.

4.3. Anthropometric measurement

Anthropometric measurements, specifically on weight and height are becoming more frequently performed in child health and nutritional status assessment. Using the standard measures of height for age, weight for age, and weight for height, nutritional status of children from a certain community can be assessed. However, from these studies, while weight and height measurements are subject to the risks of unreliability, that is the extent to which the same measurement is supposed to be obtained on repeated trials, and inaccuracy, that is the nearness of a supposed measurement to the value, the biggest problem in assessing nutritional status probably comes from the age information because this is mostly based on recall instead of vital registration documents. For that reason, age information is described before weight and height.

4.3.1. Age

Age of children is recorded in months. Since vital registration of births in Bali is not complete, alternative methods must be used to obtain age information are provided for those whose birth dates were not available. One of the methods is by converting the Balinese calendar, where the birthday is celebrated exactly every 210 days, locally known as one *otonan* (See Chapter 2). To make sure of the date of birth, the weekday of the *otonan* must be the same. For example, if the *otonan* falls on Monday, the day of birth must be on Monday. The age is then rounded down to the last date of birthday. For example, an infant whose date of birth was found to be 15 February 1981 should be recorded to be six months in the period from 15 August 1981 up to 14 September 1981.

However, there were still great heapings in the age distribution in both male and female children and in 1980 and 1985 especially after the age of 12 months. In the three-month age groups distribution, children tended to concentrate in the age groups 12-14 months, 18-20 months, 24-26 months, 36-38 months and 48-50 months. In 1980, children aged under five in those age groups were represented 45.5 per cent for boys, and 45.1 per cent for girls; in 1985, these were 40.1 per cent for boys, and 41.5 per cent for girls. In the six-month age groups distribution, concentrations were still observed in 1980, in the age groups 36-41 months and 48-53 months in both male and female children and program and non-program *banjars*; in 1985, in the age groups 24-29 months, 36-41 months, and 48-53 months (Table 4-1).

There were 1624 children in 1980 and 1072 children in 1985, who were under five years of age. The sex ratio (number of males per 100 females) of children was as follows: in 1980, in program *banjar*, 100.2 and in non-program *banjar* 105.9; in 1985, in program *banjar*, 106.4 and in non-program *banjar*, 111.1 (Table 4-1). This figure shows more male than female children both in 1980 and 1985 and there was a tendency for more males or fewer females to be recorded in 1985 than in 1980.

The median age of children was as follows: In 1980, males 18.0 months in program *banjar* and 19.2 months in non-program *banjar*, females 20.3 months in program *banjar* and 17.3 months in non-program *banjar*; in 1985, males 17.5 months in program *banjar* and 18.1 months in non-program *banjar*, females 20.6 months in program *banjar* and 19.5 months in non-program *banjar*. So in general the median age of female children

Table 4-1. Percentage distribution of children under five by age, sex and *banjar*, 1980 and 1985.

Age group (mo.s)	Program		Non-program	
	Males	Females	Males	Females
		1980		
0-5	14.3	14.5	12.9	18.1
6-11	13.5	13.3	14.4	12.4
12-17	13.8	9.4	12.9	14.3
18-23	14.5	13.3	12.4	11.1
24-29	9.9	13.6	11.9	11.7
30-35	7.5	5.8	7.8	6.5
36-41	11.4	11.9	7.8	9.6
42-47	4.3	5.6	5.1	5.4
48-53	7.2	10.2	10.2	6.7
54-59	3.6	2.4	4.6	4.2
Total %	100.0	100.0	100.0	100.0
N	(414)	(413)	(411)	(386)
		1985		
0-5	15.0	12.2	11.9	13.1
6-11	18.8	12.9	13.7	16.3
12-17	12.1	16.3	18.4	14.3
18-23	8.2	8.4	10.1	7.5
24-29	15.4	15.6	16.6	13.5
30-35	7.9	6.1	4.7	5.2
36-41	8.9	12.2	8.7	11.5
42-47	2.9	6.5	4.7	5.5
48-53	8.2	8.7	9.0	9.5
54-59	2.5	1.1	2.2	3.6
Total %	100.0	100.0	100.0	100.0
N	(280)	(263)	(277)	(252)

was higher than that of males, the median age of males decreased from 1980 to 1985 both in program *banjar* and non-program *banjar* but it increased for females both in program *banjar* and non-program *banjar*.

4.3.2 Weight

Weight measurement was obtained by using *dacin*, a hanging scale with a capacity up to a maximum of 25 kg with increments of 100 g. This is recorded up to one decimal in kg. A jolly jumper and woven baskets made from rattan were specifically designed to be used by older children and infants respectively. Weighing was performed at the respondent's houseyard, when interviews with the respondent had been completed. In general, reliability and accuracy of weight measurement can be influenced by three main factors: the person to be weighed, the person who performs the weighing, and the scale itself. However, other factors are also apparently influential. One of them is the belief in the community. In one *banjar* in the District Mengwi, for example, a parent became nervous when his child was being weighed, because he had a belief that weighing could cause sickness to the child. Because of the belief it was found later that the child was never sent to the weighing post for a regular check-up.

The weight is recorded here as median in order to be able to make comparison with the reference population. For the purpose of simplification it is denoted as weight only. The weight of children was as follows: in 1980, males 10 kg in program *banjar* and 10 kg in non-program *banjar*, and females 9.5 kg in program *banjar* and 9 kg in non-program *banjar*, in 1985 males 9.9 kg in program *banjar* and 10 kg in non-program *banjar*, and females 9.5 kg in program *banjar* and 9.3 kg in non-program *banjar*. Not surprisingly, the weight of children shows a steady increase with age for all categories of sexes and *banjar*s at both points of time. However, the weight progressions shown in Table 4-2 seem similar for 1980 and 1985 in both program and non-program *banjar*.

If the age specific weights are standardized with total population (direct standardization) of 1980 and 1985 and separated for sex, the standardized weights were as follows: in 1980, males 10.1 kg in program *banjar* and 9.9 kg in non-program *banjar*, females 9.5 kg in program *banjar* and 9.0 kg in non-program *banjar*; in 1985, males 9.9 kg in program *banjar*, and 10.0 kg in non-program *banjar*, females 9.5 kg in program *banjar*, and 9.7 kg

Table 4-2. Median weight (kg) of children under five by age, sex, and *banjar*, 1980 and 1985 IFPNP surveys.

Age group (mo.s)	Program				Non-program			
	Males		Females		Males		Females	
	Weight	N	Weight	N	Weight	N	Weight	N
				1980				
0-5	5.7	59	5.5	60	5.5	53	5.2	70
6-11	7.8	56	7.2	55	8.0	59	7.5	48
12-17	9.0	57	8.2	39	9.0	53	8.5	55
18-23	9.8	60	9.1	55	9.7	51	9.0	43
24-29	11.0	41	10.0	56	10.5	49	10.0	45
30-35	12.1	31	11.3	24	11.1	32	11.0	25
36-41	12.5	47	12.0	49	12.0	32	12.1	37
42-47	13.0	18	12.6	23	13.8	21	12.0	21
48-53	14.0	30	13.5	42	14.1	42	12.5	26
54-59	14.3	15	13.6	10	14.0	19	15.0	16
Total	10.0	414	9.5	413	10.0	411	9.0	386
St. Wt	10.1		9.5		9.9		9.4	
				1985				
0-5	5.6	42	5.2	32	5.7	33	5.4	33
6-11	8.0	53	6.8	34	8.0	38	7.3	41
12-17	9.5	34	8.4	43	9.0	51	8.3	36
18-23	9.5	23	9.5	22	10.1	28	9.4	19
24-29	10.5	43	10.2	41	10.5	46	10.2	34
30-35	11.7	22	11.5	16	12.1	13	13.3	13
36-41	12.9	25	12.0	32	12.1	24	13.0	29
42-47	13.4	8	13.0	17	13.1	13	13.5	14
48-53	12.6	23	13.4	23	13.5	25	13.4	24
54-59	13.4	7	13.5	3	14.3	6	14.0	9
Total	9.9	280	9.5	263	10.0	277	9.3	252
St. Wt	9.9		9.5		10.0		9.7	

in non-program *banjar*. Without exception weights of males were higher than females. In 1980, weights of both males and females were higher in program *banjar* than non-program *banjar*, but in 1985 the weights of both males and females were lower in program *banjar* than in non-program *banjar*. Weights of all categories increased from 1980 to 1985, except for males in program *banjar*.

Weight increments generally occurred steadily with the increase in age groups, except in the age groups 48-53 months and 54-59 months for male children and 36-41 months and 42-47 months for female children in the non-program *banjar* in 1980, and in the age groups 42-47 months and 48-53 months for male children in the program *banjar* and 30-35 months and 36-41 months for female children in the non-program *banjar* in 1985. These would probably be smoother if there was no heaping in the age distribution.

4.3.3. Height

Height or length of children was measured differently according to the capacity of the children. Height was measured in a standing position for those children who were able to co-operate by standing during the procedure; those who could not were measured in the recumbent position. The standard procedure, however, is to measure children according to their age: under two in a supine position, over two standing up.

Two people are needed for measuring the length of an infant. One person helps to hold the infant's head firmly against the headboard so the infant is looking vertically upward. The other person uses one hand to straighten the infants's legs with toes pointed directly up and the other to move the footboard toward the infant's feet, then reads the measurement indicated up to the position of the footboard. Measuring the length of an infant is much harder than measuring the height of older children because of the difficulty in holding straight the infant's legs which usually move actively. Besides, if the infant's legs hit the footboard the infant's head will move upward and hit the headboard when most people would reflexly move the infant from the measuring device.

Table 4-3 shows median heights of children as follows: in 1980, males 77.3 cm in program *banjar* and 77.5 cm in non-program *banjar*, females 78.5 cm in program *banjar* and 75.0 cm in non-program *banjar*; in 1985, males 76.3 cm in program *banjar* and 76.7 cm in non-program *banjar*, females 77.0 cm in program *banjar* and 76.0 cm in non-program *banjar*. The median heights of males were greater than those of females in non-

program *banjar* both in 1980 and 1985, however, they were lower in program *banjar* for both 1980 and 1985. Here again the median heights look consistent with the median age of the children.

When direct standardization is done, using the specific sex of the total population of children under five years of age 1980 and 1985 as the standard, the average height of children is as follows: In 1980, males 78.1 cm in program *banjar* and 77.6 cm in non-program *banjar*, females 77.4 cm in program *banjar* and 77.1 cm in non-program *banjar*; in 1985, males 77.0 cm in program *banjar* and 77.8 cm in non-program *banjar*, females 76.3 cm in program *banjar* and 76.8 cm in non-program *banjar*.

4.3.4. Weight and height

Based on the methods used to collect the data, weight and height can be considered to have the best validity both internally, that is with the bias created by the influence of the researcher's presence and externally, that is with the bias created by environmental factors (Burgess, 1984:144), to be used for nutritional assessment compared with weight for age and height for age. As mentioned earlier both weight and height were collected by measurement while age was based mostly on recall. Different from data on weight for age and height for age, where weight or height is sometimes found to be the same or even lower in older age groups, weight for height shows that the median weights increase evenly as the height groups increase. This is found in all categories such as sex and *banjar*, both in 1980 and 1985.

Table 4.4 shows that median weights of males are higher than those of females in both program *banjar* and non-program *banjar* in 1980 and 1985. In 1980, weights of total children were the same for males in both *banjar*, but for females they were higher in program *banjar*. In 1985, they were higher in non-program *banjar* for males, but for females they were higher in program *banjar*. Except for males in program *banjar*, weights of total children increased from 1980 to 1985. However, after direct standardization using the total population of 1980 and 1985 separated for sex, all median weights for total children increased. The magnitude of increase starting from the highest is as follows: Females in program *banjar*, females in non-program *banjar*, males in non-program *banjar*, and the least males in program *banjar*. So females experienced more weight gain than males and non-program *banjar* more than program *banjar*.

Table 4-3. Median height (cm) of children under five by age, sex, and *banjar*, 1980 and 1985 IFPNP surveys.

Age group (mo.s)	Program				Non-program			
	Males	N	Females	N	Males	N	Females	N
				1980				
0-5	60.0	59	58.8	60	57.2	53	59.0	70
6-11	67.3	56	66.0	55	69.0	59	67.8	48
12-17	73.0	57	71.5	39	74.2	53	73.2	55
18-23	77.3	60	75.8	55	76.2	51	75.5	43
24-29	82.5	41	83.0	56	80.5	49	80.0	45
30-35	86.0	31	86.0	24	85.0	32	85.0	25
36-41	88.5	47	89.0	49	86.7	32	87.0	37
42-47	92.3	18	89.7	23	95.0	21	89.0	21
48-53	95.7	30	93.5	42	95.0	42	93.2	26
54-59	97.0	15	97.7	10	98.0	19	98.0	16
Total	77.3	414	78.5	413	77.5	411	75.0	386
St. Ht	78.1		77.4		77.6		77.1	
				1985				
0-5	56.5	42	58.0	32	58.2	33	59.0	33
6-11	68.0	53	65.3	34	67.0	38	67.0	41
12-17	74.3	34	72.0	43	72.0	51	71.1	36
18-23	77.0	23	77.5	22	78.4	28	73.0	19
24-29	80.0	43	80.2	41	81.8	46	81.0	34
30-35	84.8	22	85.0	16	90.0	13	82.5	13
36-41	86.9	25	86.9	32	88.0	24	89.0	29
42-47	93.7	8	89.7	17	90.0	13	92.8	14
48-53	92.2	23	90.5	23	93.0	25	92.5	24
54-59	94.5	7	91.0	3	98.9	6	95.5	9
Total	76.3	280	77.0	263	76.7	277	76.0	252
St. Ht	77.0		76.3		77.8		76.8	

4.3.5. Changes in weight and height

Increase in weight for males from 1980 to 1985 was found in the age groups 12-17 months, 36-41 months, and 42-47 months in program *banjar*, but the standardized total weight decreased from 10.1 kg in 1980 to 9.9 kg in 1985. In non-program *banjar* increase in weight for males from 1980 to 1985 was found in the age groups 0-5 months, 18-23 months, 30-35 months, and 54-59 months. The standardized total weight also increased from 9.9 kg in 1980 to 10.0 kg in 1985 (Figure 4-1). Compared to the reference population (WHO, 1983), the weights of males were generally lower in all age groups, except in age group 0-5 months where weights were the same or even higher.

Increase in weight for females from 1980 to 1985 was found in the age groups 18-23 months, 24-29 months, 30-35 months, and 42-47 months in program *banjar*. The standardized total weight remained the same 9.5 kg for both 1980 and 1985. In non-program *banjar* increase in weight for females from 1980 to 1985 was found in the age groups 0-5 months, 18-23 months, 24-29 months, 30-35 months, 36-41 months, 42-47 months, and 48-53 months. The standardized total weight also increased from 9.4 kg in 1980 to 9.7 kg in 1985 (Figure 4-2). The weights of females compared with those of the reference population were generally lower in all age groups except at the age groups 0-5 months where weights were higher than the reference population for all *banjar* categories both in 1980 and 1985.

Increase in height for males from 1980 to 1985 in program *banjar* was found in the age groups 6-11 months, 12-17 months, and 42-47 months, but the total standardized height decreased from 78.1 cm in 1980 to 77.0 cm in 1985. In non-program *banjar* increase in height for males from 1980 to 1985 was found in the age groups 0-5 months, 18-23 months, 24-29 months, 30-35 months, 36-41 months, and 54-59 months (Figure 4-3). The total standardized height also increased from 77.5 cm in 1980 to 77.8 cm in 1985. Compared to the reference population, heights of males were lower in almost all age groups, except in program *banjar* in 1980 in the age group 0-5 months.

Increase in height for females from 1980 to 1985 in program *banjar* was found in the age groups 12-17 months, 18-23 months, and 42-47 months. The total standardized height, however, decreased from 77.4 cm in 1980 to 76.4 cm in 1985. In non-program *banjar* increase in height for females from 1980 to 1985 was found in the age groups

Table 4-4. Median weights (kg) of children under five by height, *banjar* and sex, 1980 and 1985.

Height (cm)	Median weight (kg)							
	Program				Non-program			
	Males		Females		Males		Females	
	Weight	N	Weight	N	Weight	N	Weight	N
				1980				
-49.9	3.5	5	3.4	4	3.2	7	5.1	12
50-59.9	4.9	26	5.0	33	4.9	28	4.9	28
60-69.9	7.2	87	7.0	79	7.5	64	7.0	81
70-79.9	9.0	111	8.7	98	9.0	126	8.8	110
80-89.9	11.5	100	11.0	106	11.0	97	10.5	92
90-99.9	13.0	69	12.6	73	13.7	64	12.8	52
100-	15.6	16	16.3	20	15.0	25	15.0	13
Total	10.0	419	9.5	414	10.0	411	9.0	389
St. Wt	9.8		9.4		9.8		9.3	
				1985				
-49.9	4.0	2	3.5	5	3.0	2	3.5	5
50-59.9	5.1	28	4.9	18	5.0	19	5.1	19
60-69.9	7.6	61	7.1	50	7.7	63	7.2	59
70-79.9	9.4	73	8.9	76	9.9	72	8.9	55
80-89.9	11.2	72	11.6	76	11.1	62	11.3	57
90-99.9	13.3	40	13.1	32	13.5	52	13.7	53
100-	15.3	4	16.5	6	15.1	6	14.9	4
Total	9.9	280	9.5	263	10.0	276	9.3	252
St. Wt	9.9		9.8		10.1		9.7	

Figure 4.1. Median weight, boys under 5 years by age, 1980 & 1985.

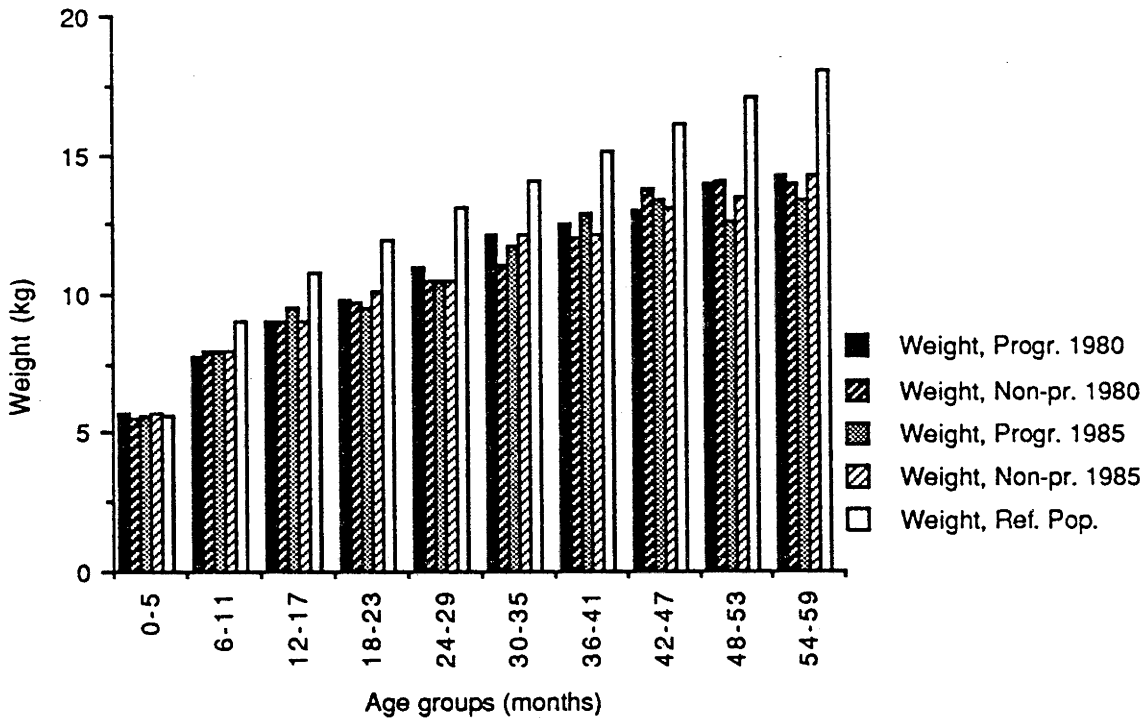
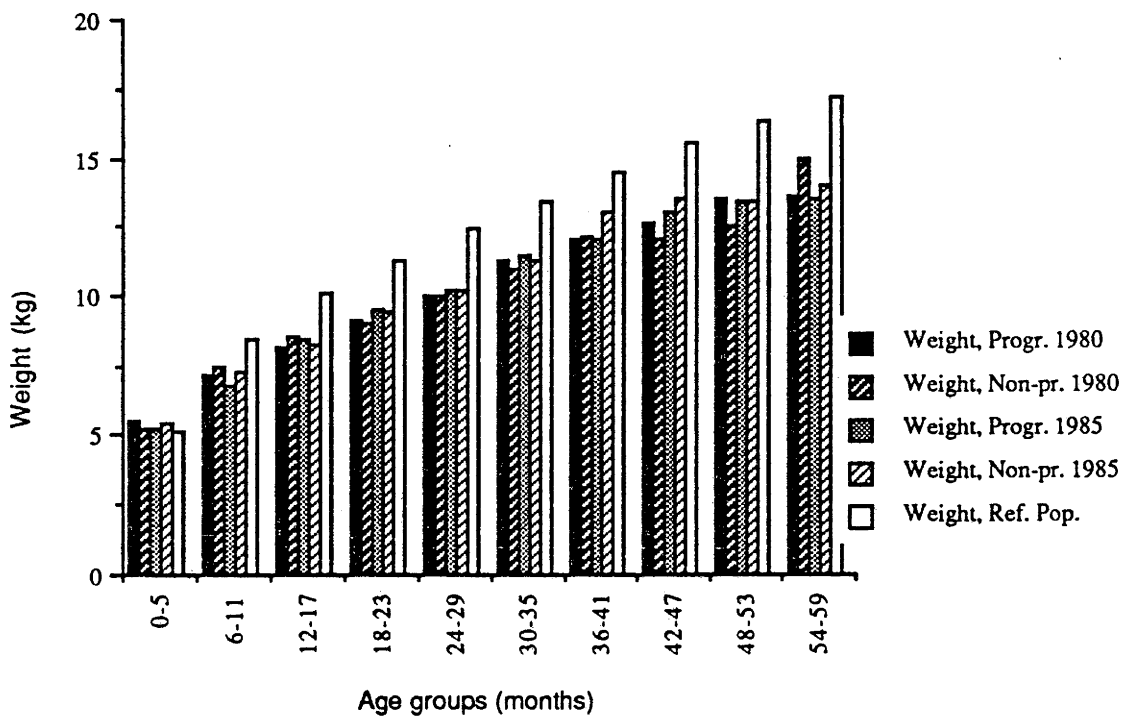


Figure 4.2. Median weight, girls under 5 years by age, 1980 &1985.



24-29 months, 36-41 months, and 42-47 months. The total standardized height, however, decreased from 77.1 cm in 1980 to 76.8 cm in 1985 (Figure 4-4). Compared to the reference population heights for females were lower in all age groups, program *banjar* and *banjar*, both in 1980 and 1985.

Increase in weight for males from 1980 to 1985 in program *banjar* was found in height groups below 50 cm, 50-60 cm, 60-70 cm, 70-80 cm, and 90-100 cm. The total standardized weight increased from 9.8 kg in 1980 to 9.9 kg in 1985. In non-program *banjar* increase in weight for males was found in the height groups 50-60 cm, 60-70 cm, 70-80 cm, 80-90 cm, and over 100 cm. The total standardized weight also increased from 9.8 kg in 1980 to 10.1 kg in 1985 (Figure 4-5). Compared with the reference population weights of males were higher up to 70 cm in both program *banjar* and non-program *banjar* in 1980 and 1985, and up to 80 cm in non-program *banjar* in 1985.

Increase in weight for females from 1980 to 1985 in program *banjar* was found in height groups 60-70 cm, 70-80 cm, 80-90 cm, 90-100cm, and over 100 cm. The total standardized weight also increased from 9.4 kg in 1980 to 9.8 kg in 1985. In non-program *banjar* increase in weight for females from 1980 to 1985 was found in almost all height groups except in height groups below 50 cm and over 100 cm. The total standardized weight also increased from 9.3 kg in 1980 to 9.7 kg in 1985 (Figure 4-6). Compared to the reference population, as with males, weights of females were also higher up to 70 cm, but lower thereafter. The difference of children's average weight between the program *banjar* and the non-program *banjar*, in 1980, for male children was negative (children in non-program *banjar* were heavier than those in program *banjar*) in height groups 60-69.9 cm and 80-89.9 cm, for female children was negative in height group 49.9 cm or lower, 70-79.9 cm, and 90-99.9 cm; in 1985, for male children was negative in height group 60-69.9 cm, 70-79.9 centimetres, and 90-99.9 cm, for female children in height group 50-59.9 cm, 60-69.9 cm, and 90-99.9 cm. The difference for total height groups children, in 1980 was nil for males, 0.5 kg for females; in 1985 was 0.4 kg for males and 0.7 kg for males. So in the weight for height indicator children in the program *banjar* gained more in average weight than those in the non-program *banjar* for both male and female children.

So from three indicators of growth, weight for height shows the most prominent

Figure 4.3. Median height, boys under 5 years by age, 1980 &1985.

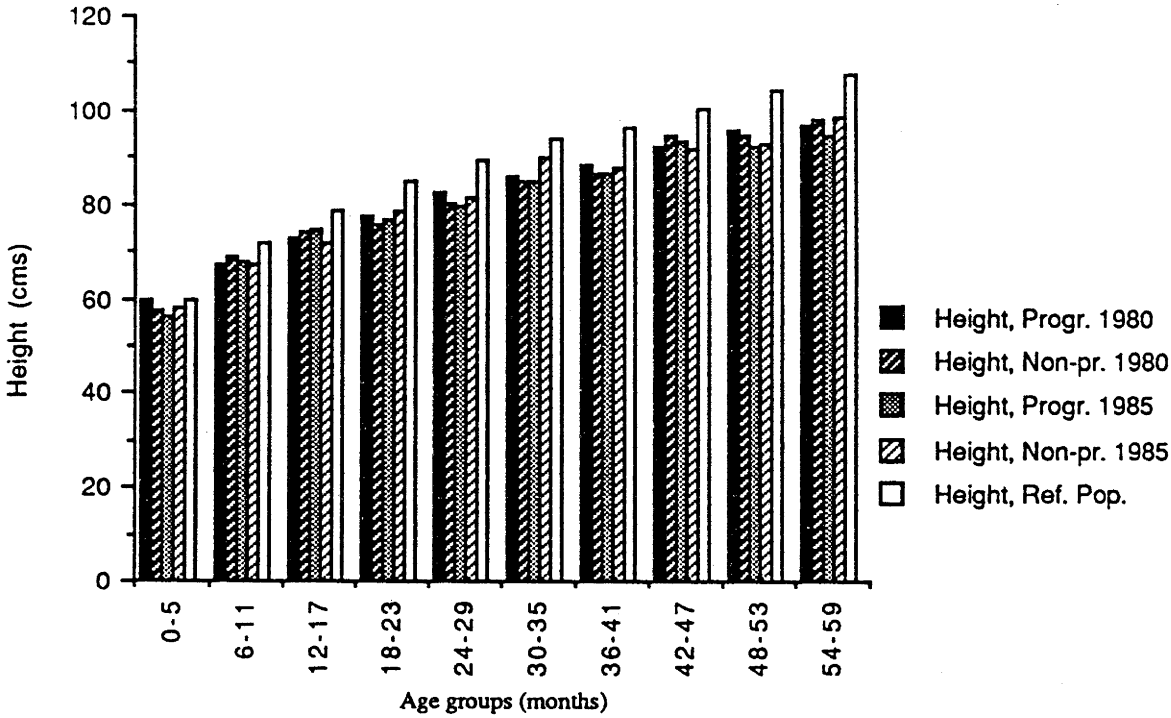


Figure 4.4. Median height, girls under 5 years by age, 1980 &1985.

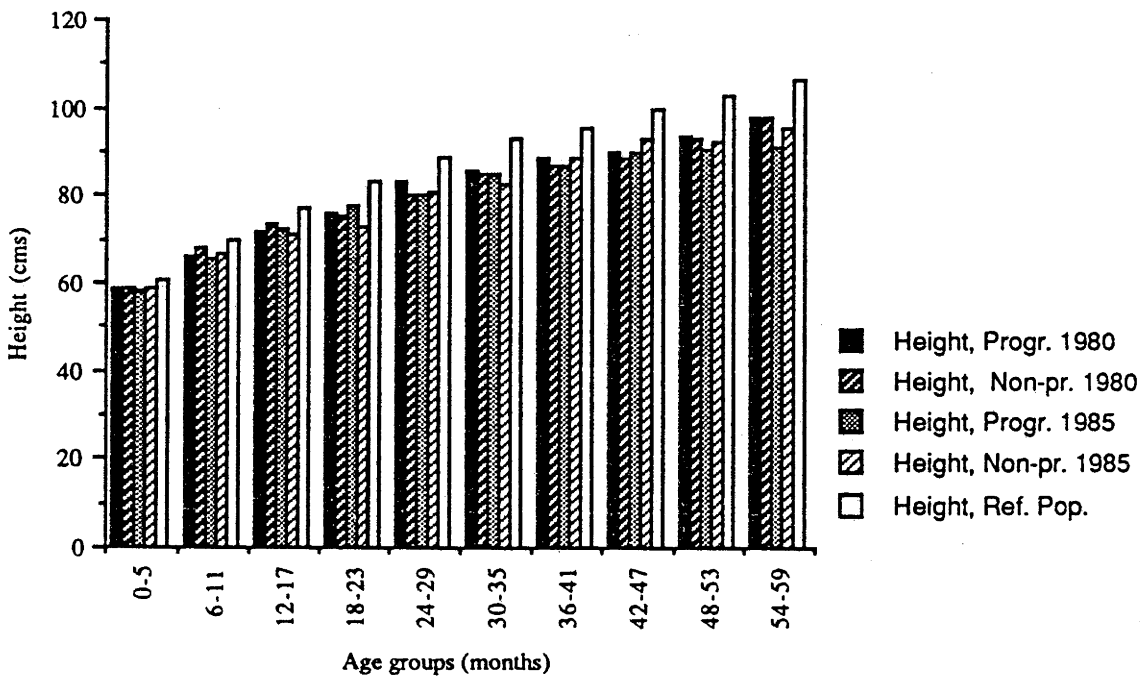


Figure 4.5. Median weight, boys under 5 years by height, 1980 &1985.

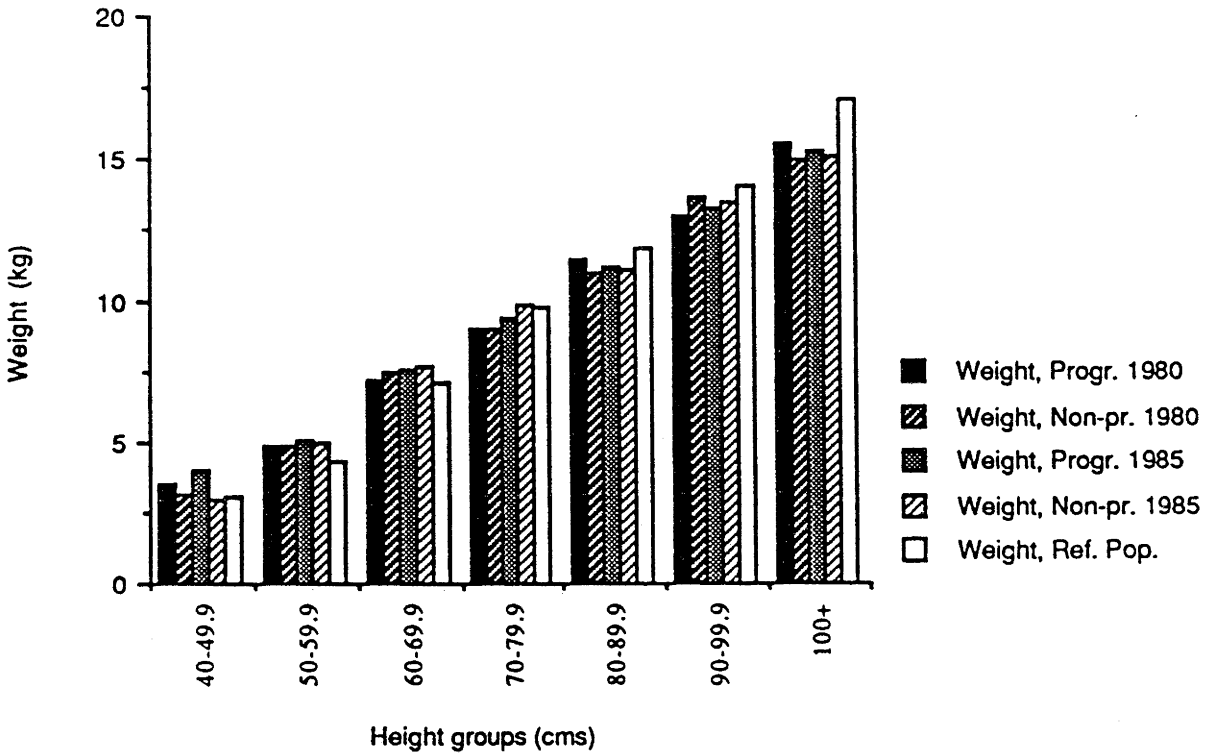
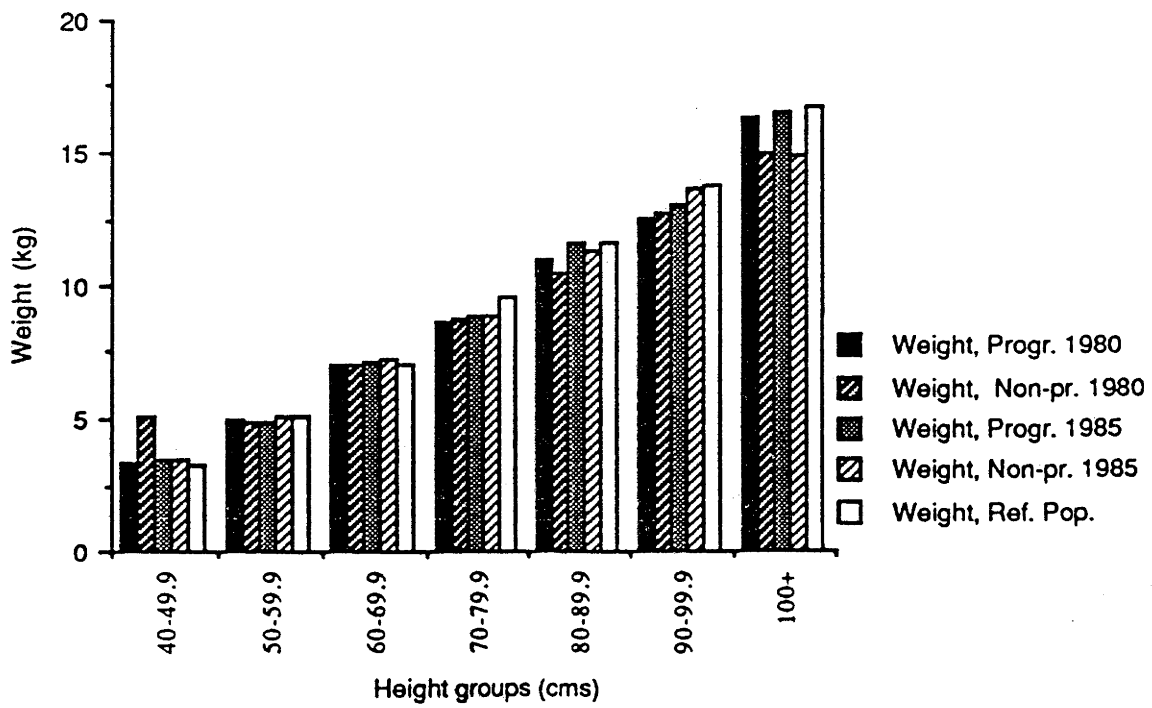


Figure 4.6. Median weight, girls under 5 years by height, 1980 &1985.



improvement during the period 1980 to 1985, followed by weight for age, and the least is height for age. At the level of *banjar*, non-program *banjars* show more improvement than program *banjar*; and girls grow better than boys.

4.4. Nutritional status

Nutritional status can be assessed by various methods depending on the availability of the tools and the investigator's interest in collecting, interpreting, and the use of the assessment. Clinical examination, for example, is mainly with the intention of giving treatment as soon as possible on the basis of fast investigation from the individual's medical historical background and early signs and symptoms of nutritional disorders; biochemical assays are concerned with any abnormal biochemical process occurring in the body, and so on. Another method at present becoming more attractive is the use of anthropometry, especially weight and height measurements which are used for assessing children's nutritional status.

Weight and height measurements in relation to age can be used to detect earlier protein-energy malnutrition (PEM), the most severe and widespread nutritional deficiency, especially among children. This is very important in preventing prolonged and serious malnutrition conditions such as marasmus, a gross shortage of both calories and protein occurring usually in infancy, and *kwashiorkor*, primarily a shortage of protein occurring usually in children aged one to three years. These conditions can lead to mental or intellectual impairment with ultimately irreversible brain damage. Inversely, studies conducted in countries which have experienced nutritional improvement, such as Japan and Taiwan, all point to remarkable increases in stature (Population Reference Bureau, 1973; see also Chapter 1).

So improvement in nutritional status among children under five during the five-year integrated nutrition and health program in Bali will be very rewarding not only for individuals or organizations involved in the program but more importantly also for the future generation of the people in Bali in particular and Indonesia in general. This is also the right way to achieve a better health condition as defined by WHO as a complete state of mental, physical and social well-being and not merely the absence of disease or impairment; in the Indonesian version to be *manusia Indonesia seutuhnya*, a complete

human being. However, nutritional assessment using age as weight for age and height for age should be interpreted cautiously for the reasons mentioned earlier, particularly with regard to the unavailability of birth registration to get the exact age of children.

4.4.1. Balinese perception of nutritional status

Actually a person, either cachectic (very thin) or overfat, has no proper place in Bali. Unless this kind of person feels free to live isolated from the community or tries hard to keep his body looking good he will suffer endless embarrassment, in contrast to a strong handsome man and a beautiful sexy woman.

Among many others, there are two common expressions for a cachectic person in the community. The first is to *cicing kacang*, a bean-like dog.[1] If a cachectic person joins or just passes by another group of people it is not uncommon that they will say jokingly : '*Beh, cii brag tigris cara cicing kacang sing taen ngamah*, (you, with no flesh like a *cicing kacang*, dog eats nothing)'. The second is *i sangut*, one of the servant actors on the left in the shadow puppet show. The puppet has scanty long hair, wide eyes, long neck, thin thorax and limbs, and fat belly. He has an uncertain personality, and usually follows the winning and stronger side. So, besides being bad looking, a cachectic person is also characterized as having no identity and no bright future.

An overfat person is not good, either. This person is usually described as having the behaviour of a pig intentionally fattened. A pig's activity is only sleeping, and getting up to eat. People uses a phrase taken from the four servant actors in the shadow puppet show, *delem, sangut, merdah, tualen*, to associate the sound to *medem, bangun, ngamah, dogen* meaning sleep, get up, eat, only. So an overfat person will be characterized as having the behaviour of a pig who spends his life only to sleep and get up whenever hungry. In the shadow puppet show, *satus korawa*, the one hundred brothers of the Korawa family as the left side in the *Bharata yuda* story and demonic Rahwana as the left side in the *Ramayana* story are depicted as full of greed with big fat bodies or a large quantity of family members but with low quality and always defeated. In order to prevent

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[1]This sort of dog has a small stature, very short hair, and a relatively long tail, but has a noisy and high toned bark. It is common to see this kind of dog in the street because people do not care for them, so they live on rubbish or whatever they can find to eat, in contrast to *cicing kintamani*, a very well cared for and good looking dog originating and bred at Kintamani, one of the most beautifully scenic hill areas in Bali.

overfat and pig-like behaviour parents usually instruct children not to eat too much nor sleep as soon as they finish having a meal.

In contrast to either cachectic or overfat bad looks and bad behaviour, Balinese are eager to have handsome and strong, brave, and clever men with the characteristics illustrated in *panca pandawa*, the five brothers of the Pandawa family such as Dharmawangsa, symbol of wistfulness, Bima, symbol of strength, Arjuna, symbol of cleverness and man's sex appeal; or as Rama who defeated the demoniac big fat Rahwana. A shapely, beautiful and sexy woman is associated with Supraba, a nymph and wife of the five brothers Pandawa, or Dewi Sita the wife of Rama. Balinese also admire the perfect beauty of Ni Layonsari, and the charm of Jayaprana the husband of Ni Layonsari, a semi-historical couple believed to have lived once in the ancient kingdom of Buleleng. Jayaprana, a very handsome man, was killed by the jealous king who wanted to marry beautiful Layonsari, but she was found dead from suicide following the death of her husband before the king could touch her. In popular Balinese words a girl or woman who looks pretty and sexy is called *moleh*.

4.4.2. The nutritional assessment

Nutritional status is derived from weight and height measurements with relationship to age, using the reference population from WHO 1983 and stated as standard deviation (SD) score called Z-score. The following is an illustration to find the value of the Z-score. An average boy, according to the MCHS reference, aged 48 months is of 12.5 kg weight and 100.0 cm height. The Z-score for each assessment can be calculated from the following equation.

$$\text{Z-score} = \frac{\text{(subject's value)} - \text{(median value of ref.pop.)}}{\text{(md.value of ref.pop.)} - \text{(1 S.D.value below or above ref.pop.)}}$$

The Z-score of the boy,

$$\text{HFA : Z-score} = \frac{(100.0 - 102.9)}{102.9 - 98.7} = \frac{-2.9}{4.2} = -0.69$$

$$\text{WFA : Z-score} = \frac{(12.5-16.0)}{16.0 - 14.3} = \frac{-3.5}{1.7} = -2.05$$

$$\text{WFH: Z-score} = \frac{(12.5 - 15.5)}{15.5 - 14.4} = \frac{-3}{1.1} = -2.72$$

For the purpose of the program performance the nutritional status from Z-score is interpreted as follows: normal for higher than -1.00 SD, mild for -1.00 to -1.99 SD, moderate for -2.00 SD to -2.99 SD, and severe for -3 SD and lower. For statistical analysis, however, a cut-off point of -1 S.D., -2 S.D., and -3 S.D. 1 is used, and weight for height is used for analysing nutritional status in relation to several variables, assuming weight for height assessment is more reliable and accurate than height for age and weight for age.

Besides, effectiveness of the program, expressed as a ratio, in which the numerator is a measure of the reduction in the prevalence of malnutrition during the period of the program and the denominator is a measure of the prevalence of malnutrition that should be reduced, can be calculated from each indicator of assessments. Here again the cut-off point of: -1 S.D., -2 S.D., and -3 S.D. is used.

4.4.3. Nutritional status from WFH Z-Score

The Z-score from weight for height shows improvement in nutritional status of children for both males and females from 1980 to 1985. Using -2 Z-score as the cut-off point, females' nutritional status shows highly significant improvement ($df=8$, $P<0.005$) from 1980 to 1985 and so does that for the combined males and females ($df=9.1$, $P<0.005$), while that for males also shows improvement, but not significantly. In males, there was

3.8 per cent severe malnutrition in 1980 which remained to be 3.8 per cent in 1985, but at least mild malnutrition (i.e. including moderate malnutrition) decreased from 29.6 per cent in 1980 to 21.3 per cent in 1985, while the normal nutrition increased from 66.6 per cent in 1980 to 74.9 per cent in 1985. In females, there was 5.4 per cent severe malnutrition in 1980 which dropped to 2.4 per cent in 1985. At least mild malnutrition in females also decreased from 29.2 per cent in 1980 to 21.1 per cent in 1985, while normal nutrition increased from 65.5 per cent in 1980 to 72.5 per cent in 1985 (Figure 4-7).

The reduction in malnutrition prevalence in males from 1980 to 1985 is 8.3 per cent, and thus the program effectiveness is 24.9 per cent for male children. The reduction in malnutrition prevalence in females from 1980 to 1985 is 7.0 per cent, thus the program effectiveness is 20.3 per cent for female children.

4.4.4. Nutritional status from WFA Z-Score

The Z-score from weight for age shows improvement in nutritional status of children for both males and females from 1980 to 1985. In females there was 8.0 per cent severe malnutrition in 1980 which dropped to 4.8 per cent in 1985. At least mild malnutrition in females increased from 49.6 per cent in 1980 to 58.1 per cent in 1985, while normal nutrition decreased from 42.4 per cent in 1980 to 37.1 per cent in 1985. In males there was 8.0 per cent severe malnutrition in 1980 which remained to be 8.0 per cent in 1985, but at least mild malnutrition decreased from 54.1 per cent in 1980 to 51.8 per cent in 1985, while normal nutrition increased from 37.9 per cent in 1980 to 40.2 per cent in 1985 (Figure 4-8).

The reduction of malnutrition prevalence in males from 1980 to 1985 is 2.3 per cent, thus the program effectiveness is 3.7 per cent for male children. In females the reduction of malnutrition prevalence from 1980 to 1985 is -5.3 per cent, thus the program effectiveness is -9.2 per cent for female children.

Figure 4.7. Z-score (%) of WFH, boys and girls under 5 years, 1980-1985.

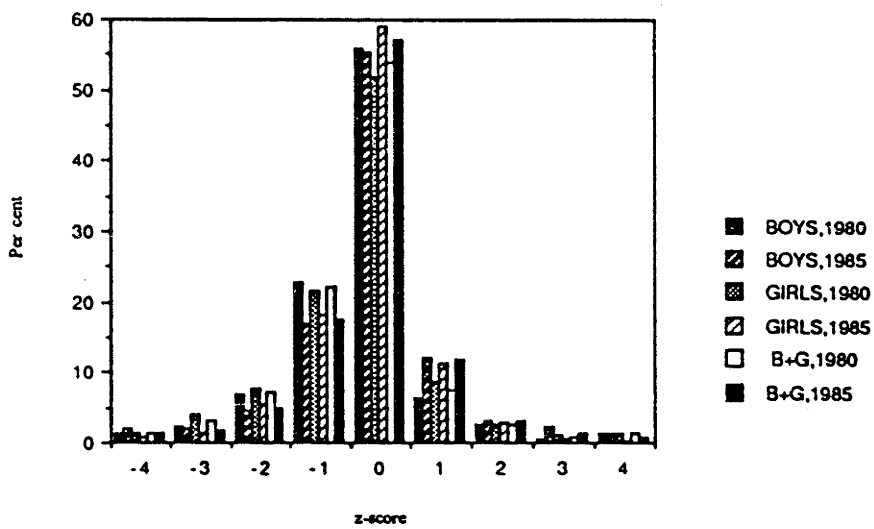


Figure 4.8. Z-score (%) of WFA, boys and girls under 5 years, 1980-1985.

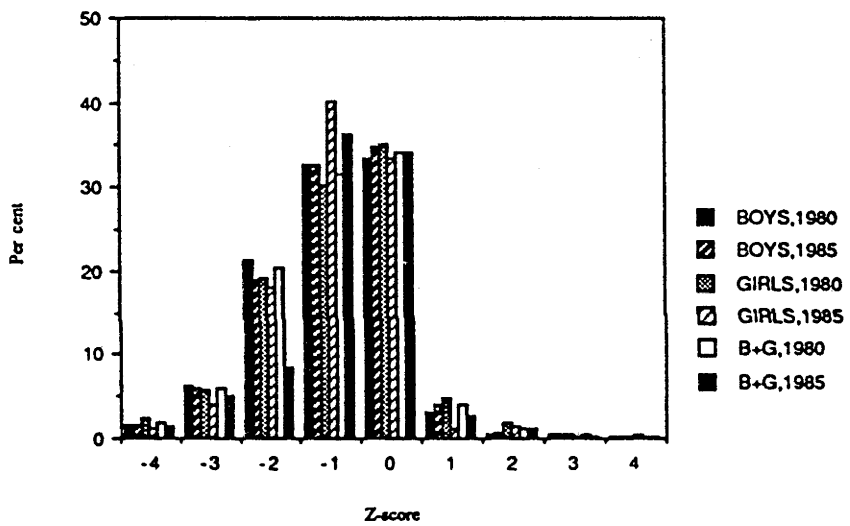
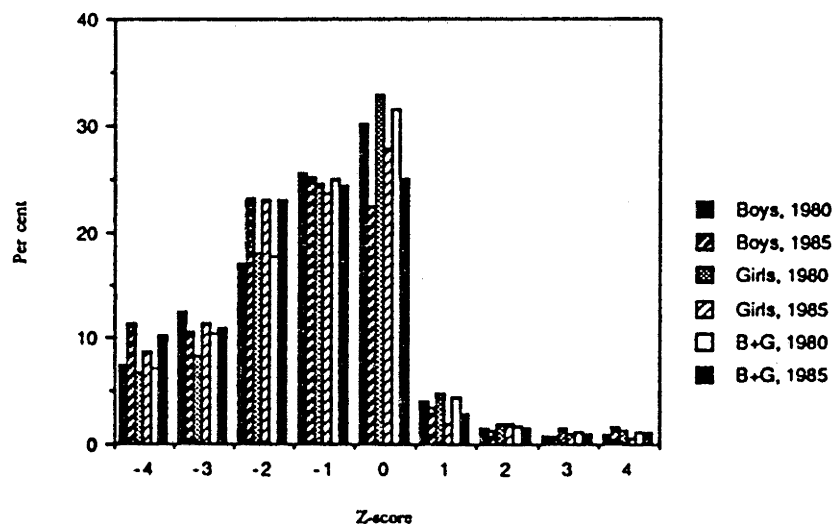


Figure 4.9. Z-score (%) of HFA, boys and girls under 5 years, 1980-1985.



4.4.5. Nutritional status from HFA Z-Score

The Z-score from height for age shows a different trend from those experienced by weight for height and weight for age from 1980 to 1985. Instead of improvement, the percentage of children in severe and mild malnutrition increases for both male and female children. Severe malnutrition in males increased from 20.0 per cent in 1980 to 21.8 per cent in 1985, and at least mild malnutrition increased from 42.6 per cent in 1980 to 47.9 per cent in 1985, while normal nutrition decreased from 37.4 per cent in 1980 to 30.3 per cent in 1985. Severe malnutrition in females increased from 14.9 per cent in 1980 to 19.2 per cent in 1985, and at least mild malnutrition increased from 43.7 per cent in 1980 to 47.1 per cent in 1985, while normal nutrition decreased from 42.4 per cent in 1980 to 33.7 per cent in 1985.

The height for age Z-score, therefore, shows an increase in malnutrition instead of a reduction, and the reduction has a negative value. The reduction of malnutrition prevalence in males is -1.8, and thus the program effectiveness is -9.0 per cent. In females the reduction of malnutrition prevalence is -4.3 per cent, thus the program effectiveness is -28.9 per cent (Figure 4-9).

If the WFA Z-score is valued as normal, the WFH Z-score as high and HFA Z-score as low then the nutritional status of children in Bali for both 1980 and 1985 can be interpreted as currently normally fed or overfed with past history of malnutrition. As the nutritional status in the WFH and WFA (in males) indicators shows improvement, but not in the HFA indicator, if this is the case of short but healthy children, then the children in Bali probably look fatter in recent years. However, the WFA, WFH, and HFA assessments in the growth charts clearly show that the younger children tend to be closer to the growth pattern of the reference population. If this can be maintained or even improved, the future population in Bali can be expected to be not only healthier but also taller.

4.4.6. Prevalence of malnutrition and age

The prevalence of malnutrition using weight for height Z-score differs with age (Table 4-5). The general age-pattern of malnutrition prevalence looks very similar in 1980 and 1985. This is high in age group 0-5 months then decreases in the age group 6-11 months. The prevalence of malnutrition increases thereafter, achieving a peak at the age group 24-29 months in 1980 and at the age group 18-23 months in 1985. The prevalence of malnutrition generally decreases from 1980 to 1985, except in the age groups 18-23 months and 48-59 months.

The program effectiveness looks irregular by age which is probably influenced by the reliability of age recording in the field. The low effectiveness at the age group 0-5 months may be influenced by the practice of breastfeeding by almost all mothers, while the amount of breastmilk is still enough for growth and development in the age group. In the age group of 18-23 months, the weaning practice can be considered as another probable factor which could worsen the nutritional status at least temporarily.

4.4.7. Prevalence of malnutrition and region

At the *banjar* level the prevalence of severe malnutrition from weight for height Z-score was higher in non-program *banjar* than in program *banjar* both in 1980 and 1985. The prevalence of malnutrition in program *banjar* was 4.3 per cent in 1980 and decreased to 1.4 per cent in 1985. The reduction of the prevalence of severe malnutrition in program *banjar* was 2.9 per cent, resulting in program effectiveness of 67.4 per cent. In the non-program *banjar* the reduction of severe malnutrition prevalence was 0.1 per cent as a result of the decrease from 5.6 per cent in 1980 to 5.5 per cent in 1985, and thus the program effectiveness in the non-program *banjar* is 1.8 per cent.

At the regional level the prevalence of at least mild malnutrition can be ranked from the highest in 1980 as follows: Gianyar, Tabanan, Klungkung, Bangli, Negara, Buleleng, Karangasem, and Badung. In 1985 the order is different from 1980 as follows: Buleleng, Negara, Badung, Gianyar, Klungkung, Karangasem, Bangli, and Tabanan. The reduction in malnutrition prevalence is significantly high in Tabanan ($P<0.001$), Bangli ($P<0.005$), Klungkung ($P<0.025$). A significant reduction is also witnessed in Karangasem ($P<0.05$) and Gianyar ($P<0.10$). In two regions, Badung and Buleleng, nutritional status worsens,

Table 4-5. Prevalence (%) of malnutrition of children under 5 years by age, IFPNP 1980 and 1985. (WFH)

Age group (mo.s) (1)	Malnutrition level below -2 SD 1980 (2)	1985 (3)	Reduct. (4)= (2-3)	Effect. (5)= (4:2)
0-5	12.3	10.9	1.4	11.4
6-11	11.7	7.4	4.3	36.8
12-17	14.4	7.5	6.9	47.9
18-23	12.7	14.3	-1.6	-12.6
24-29	18.0	11.7	6.3	35.0
30-35	7.2	4.8	2.4	33.3
36-41	9.3	4.8	4.5	48.4
42-47	6.1	4.1	2.0	32.8
48-59	8.8	8.9	-0.1	-1.1
Total	11.8	7.8	4.0	33.9

with program effectiveness of -75.0 per cent and -13.7 per cent respectively. The programme effectiveness of those regions experiencing improvement in nutritional status is as follows: Tabanan 93.4 per cent, Bangli 81.0 per cent, Karangasem 57.3 per cent, Klungkung 56.1 per cent, Gianyar 52.8 per cent, and Negara 4.7 per cent.

In general during the five-year period of the program, nutritional status improved in two out of three indicators, female children showed more improvement than male, the

prevalence of malnutrition decreased in the majority of age groups, both program *banjar* and non-program *banjar* gained better nutritional status; six out of eight regions showed improvement in nutritional status, and significant improvement was found in five out of six regions.

4.5. Multiple regression analysis

Multiple regression analysis is used to capture several independent variables in relation to a single dependent variable. The list of independent variables is grouped according to the topic of analysis such as demographic characteristics (Chapter 5), practice of family planning (Chapter 6), and socio-cultural factors (Chapter 7).

4.5.1. Dependent variable

The single dependent variable used for multiple regression analysis is a continuous interval of weight for height Z-score of under-five children's nutritional status.

4.5.2. Independent variables

The list of independent variables relevant to this Chapter which show significant correlation to children's nutritional status in the multivariate analysis is presented in Table 4-6. All independent variables, except weaning practice, were dichotomously classified. Variables of skin disease and measles in the 1980 IFPNP survey and of skin disease, fever, and diarrhoea in the 1985 IFPNP survey were derived from the question whether children ever suffered from the sickness during last month prior to data collection. The answer was coded 1 for *yes*, and 2 for *no*. The same coding was used for hair disorder, the intake of vitamin A, worm infestation, and the possesion of nutrition card. The time lapse used for worm infestation and intake of vitamin A was six months prior to data collection. Hair disorder was based on clinical obervation conducted by interviewers of senior nurses. Weaning practice was categorized as continuous interval in months.

The coefficients of the skin disease in both 1980 and 1985 IFPNP survey, of measles and hair disorder in 1980 and worm infestation and diarrhoea among older children in 1985 were quite high, suggesting the important role of the variables on nutritional status

Table 4-6. Statistical values by list of independednt variables, 1980 and 1985 IFPNP surveys.

Variables	Coefficient	T Significance
	1980	
Skin disease	-.558	.039
Measles	-.456	.057
Weaning	-.018	.018
Hair disorder	-.935	.046
R^2 : 0.041		
Significance : 0.0003		
	1985	
The youngest children		
Skin disease	-.200	.015
Fever	-.039	.013
Use of vit. A	-.046	.053
R^2 : 0.039		
Significance : 0.0002		
Older children		
Worm infestation	-.664	.053
Diarrhoea	-.678	.052
Have nutrition card	.074	.056
R^2 : 0.029		
Significance : 0.072		

of children. The negative signs of the coefficient indicate that the higher prevalence of morbidity rates of the sicknesses or disorders led to worsen children's nutritional status. More detailed interpretation of each independent variable is described in the following section.

4.6. Program interventions

4.6.1. Immunization, vitamin A distribution, breastfeeding, and weighing activities

Immunization coverage rates among children aged under five years, especially for DPT and BCG increased significantly from 1980 to 1985. The coverage rate for BCG increased from 30.5 per cent in 1980 to 53.5 per cent in the program *banjar* and 55.6 per cent in the non-program banjar in 1985. The coverage rate for DPT increased from 13.9 per cent in 1980 to 28.7 per cent in the program *banjar* and 29.9 per cent in the non-program *banjar* in 1985. However, the prevalence of malnutrition was higher among immunized children than unimmunized ones in both 1980 and 1985, except in the non-program *banjar* in 1985.

In 1980 the prevalence of malnutrition was 35.1 per cent for children with BCG immunization and 33.5 per cent for children without BCG immunization. In 1985 the prevalence of malnutrition among the youngest children was 28.1 percent for children with BCG immunization and 26.7 per cent for children without BCG immunization in the program *banjar*, and 25.0 per cent for children with BCG immunization and 26.3 per cent for children without BCG immunization in the non-program *banjar*. In 1980 the prevalence of malnutrition was 37.3 per cent for children with DPT immunization and 33.3 per cent for children without DPT immunization. In 1985 the prevalence of malnutrition among the youngest children was 28.7 per cent for children with DPT immunization and 27.4 per cent for children without DPT immunization in the program *banjar*, and 23.7 per cent for children with DPT immunization and 26,7 per cent for children without DPT immunization in the non-program *banjar*.

4.6.2. Vitamin A distribution

In the 1985 IFPNP survey the respondents were asked whether their children were given vitamin A during the last six months. The coverage rate of children treated with itamin A was 40.2 per cent for the youngest children and 47.2 per cent for older children in the program *banjar* and 36.2 per cent for the youngest children and 37.9 per cent for older children in the non-program *banjar*. The prevalence of malnutrition of children with vitamin A treatment was higher than children without Vitamin A treatment in the program *banjar*, but in the non-program *banjar* the prevalence of malnutrition was higher for children without vitamin A treatment than for children with vitamin A treatment.

4.6.3. Breastfeeding

Illingworth (1984: 6) argued that a solely breast-fed baby is likely to have better nutritional status than an artificially fed baby. It is common for a mother in Bali to let a grandmother care for her child while she is working. The grandmother would let the grandchild suck her hanging and empty breast, which is called *kopek*, just to make the child stop crying. While the child is sucking the empty breast, the grandmother gently rocks the child and sings a song in soft tones accompanying the child to sleep. The mother herself does the same thing when she is with her child. If the child has grown too big (after four months) to be fulfilled with only breastmilk, stopping it from crying by soothing it to sleep will certainly affect the child by depriving it of nutrients needed for its growth and development. So unless enough food supplement is given to a child according to its growth and development stage, the importance of breastfeeding to older children is doubtful.

Almost all children were breastfed in the IFPNP surveys. There were 99.2 per cent of children in the program *banjar* and 97.7 per cent in the non-program *banjar* who were ever breastfed. Because a very small number of children did not get breastmilk, the nutritional status assessment in relation to breastfeeding does not have much effect on the prevalence of malnutrition for the total children. The average weaning period was 20.0 months in the program *banjar* and 19.5 months in the non-program *banjar* in the 1985 IFPNP survey. Multiple regression analysis showed that the period of weaning was negatively and significantly ($P< 0.02$) correlated with the prevalence of malnutrition in the total children in the 1980 IFPNP survey.

In the program *banjar* 69 per cent of the youngest children and 77.8 per cent of older children ever participated in weighing activities compared to 58.7 per cent of the youngest children and 66.7 per cent of older children participating in the weighing activities in the non-program *banjar*. The prevalence of malnutrition was higher for children participating in weighing activities for both the youngest and older children and in the program *banjar* and non-program *banjar*.

Multiple regression analysis showed that among the youngest children actively participating in the weighing activities in the 1985 IFPNP survey were significantly (<0.04) positively correlated with the prevalence of malnutrition.

4.6.4. Prevalence of morbidity

Morbidity information was collected in both the 1980 and 1985 IFPNP surveys. The respondents were asked whether children had suffered from certain sicknesses or diseases during the last month when the interview was conducted. While such data are always affected by recall problems, in 1980 the reported prevalence of sicknesses was: fever 47.9 per cent, cold 35.7 per cent, whooping cough 2.8 per cent, diarrhoea 17.4 per cent, measles 5.3 per cent, mumps 1.3 per cent, and skin disease 8.5 per cent. All children suffering from the sicknesses or diseases had significantly higher malnutrition and this was particularly statistically significant for measles, fever, cold, and diarrhoea. In the 1985 survey the reported prevalence of diseases was: diarrhoea 36.8 per cent, fever 60.7 per cent, coughing 52,8 per cent, cold 68.2 per cent, and skin diseases 13.9 per cent. Therefore, there was increase in the reported prevalence of all diseases from 1980 to 1985. The prevalence of malnutrition, on the other hand was higher among children suffering from certain diseases or sicknesses: skin diseases and diarrhoea, but lower for certain diseases such as fever, coughing, and cold.

Multiple regression analysis showed that the skin diseases suffered at any time during the period of one month prior to the data collection were highly significantly (<0.01) correlated to higher prevalence of malnutrition in both the 1980 IFPNP survey (for the total children) and the 1985 IFPNP survey (for the youngest children). The highly significant correlation was also found between the prevalence of fevers and the prevalence of malnutrition in the youngest children in the 1985 IFPNP survey, while in the 1980 IFPNP survey a significant (P<0.06) correlation was found between the

prevalence of measles and the prevalence of malnutrition in the total children. Diarrhoeal diseases (at any time during one month) and the existence of worms in the children's stools (at any time during six months) prior to the data collection were significantly ($P< 0.05$) and negatively correlated with the prevalence of malnutrition in older children in the 1985 IFPNP survey.

4.7. Conclusion

The number of male children under five exceeded the number of female children of the same age group in both 1980 and 1985 and in the program *banjar* and the non-program *banjar*. The median age of male children was higher in the non-program *banjar* in both 1980 and 1985 than in the program *banjar*. However, the median age of female children was higher in the program *banjar* in both 1980 and 1985 than in the non-program *banjar*. Also the median age of male children decreased from 1980 to 1985, while this increased in female children. The age information was probably less accurate due to lack of birth registration as shown in the large heaping especially in older age groups of age distribution.

In general children were heavier but shorter in 1985 than in 1980, except for males in non-program *banjar*. The male children were heavier than females in all categories of *banjar* and in both 1980 and 1985. However,the median weight for height, especially the standardized one, shows improvement in weights of children in all categories of *banjar* from 1980 to 1985. The median weight for height shows a better trend for the younger children compared with the reference population, which could mean that younger children have a better future, assuming that care for their nutritional status can be maintained or even improved as they are growing older.

The nutritional status from weight for height assessment was improved in almost all age groups. The exception is found in the age groups 18-23 months and 48 months and over. In terms of children's nutritional status improvement during the five-year period of the programme, Tabanan ranks the first follwed by Bangli, Klungkung, Karangasem, Gianyar, and Jembrana, while two regions, Badung and Buleleng experienced deterioration of the children's nutritional status.

Weight for height and weight for age assessments indicate improvement in children's

nutritional status from 1980 to 1985 for both males and females. Female children, however, gained more than males. As in anthropometric data of weight and height, the nutritional assessment shows that the value of weight for height is the highest followed by weight for age, while height for age shows a decrease from 1980 to 1985. If weight for age is considered normal, weight for height is high, and height for age is low, then children's nutritional status can be interpreted to mean that at the time the studies were conducted the children generally were in the condition of normally or even overfed with a possibility of past history of malnutrition, especially those in higher age groups.

Using the Z-score, weight for height clearly showed improvement of children's nutritional status in program *banjar* from 1980 to 1985 for all cut-off points -3 S.D., -2 S.D., and -1 S.D., while in the non-program *banjar* there was no difference shown from 1980 to 1985 for all of the cut-off points. There was no difference in children's nutritional status between the program and the non-program *banjar* in 1980. In 1980 a significantly lower proportion with severe malnutrition was found in the non-program *banjar* than in the program *banjar*, but there was no difference in the prevalence of moderate and mild malnutrition. These suggested the improvement in children's nutritional status achieved by the program activities from 1980 to 1985.

The prevalence level of diseases associated with malnutrition was found particularly before the program started in 1980. Higher prevalence of malnutrition was found in almost all children who experienced diseases during one month prior to data collection in 1980. In 1985 higher prevalence of malnutrition was found only in those suffering from diarrhoea and skin diseases. Unexpectedly the recorded prevalence of morbidity increased for all cases from 1980 to 1985, which probably indicated more attention given to the health condition of children during the program implementation than before.

The higher prevalence of malnutrition among children who got more vitamin A treatment, more complete immunization, and more participation in weighing activities in the program *banjar* probably suggested a more active investigation conducted of sick children in program *banjar* than in the non-program, because visiting children in their homes if they did not come to the weighing posts was one of the cadres' jobs during the program implementation. In these cases the program interventions were intended to be the treatment instead of prevention of certain sicknesses or diseases, while the effect of the treatment was not yet evident when data collection was conducted.

Multiple regression analysis showed that skin diseases, measles, diarrhoea, worms, and fever were significantly correlated with malnutrition. In the 1980 IFPNP survey a negative was found between the duration of breastfeeding and children's nutritional status. However, this correlation would be meaningful to the extent that mothers follow the right schedule of giving food supplements in line with children's stage of development (see Chapter 1).

Chapter 5

Influences of household demographic characteristics on children's nutritional status

5.1. Introduction

The awareness of population problems facing Indonesia has grown to an extent that involves the government which has shown a strong political will and commitment to solve the problems. This can be seen from the attention given by President Soeharto, who frequently warns the people of the dangerous effects on national development and welfare if the people do not actively take part in solving population problems. In a state address to celebrate the 38th Independence Day in 1983, for example, Soeharto emphasized that the 5-year Development Plan would not be successful without solving population problems by, for example, controlling fertility, reducing mortality, and increasing physical fitness in order to improve the quality of life as reflected by the increase in life expectancy (Bali Provincial DOH, 1983).

One of the most exciting demographic events during the last two decades was a continuous decline in fertility (Hull, Hull and Singarimbun, 1974; Streatfield, 1986; Hull, 1987). In Bali this has been even more drastic, achieving the targeted level of fertility earlier than the due time of 1990, since in 1985 the fertility rate was less than half of that in 1971. The fertility decline in Bali is also interesting because of the magnitude of the decline: from among the highest provinces in 1967-70 to the third lowest in 1985; only D.K.I. Jakarta and D.I. Yogyakarta had lower rates than Bali.

In this, the only province of Indonesia where the majority of the population is Hindu, where to some extent having children is encouraged by religion[1], both the underlying causes and the effects of the decline might have worked synergistically in improving the

[1]In Hindu belief, the birth of a son saves the parents from going to hell (Jones, 1977).

nutritional status of children. The age at first marriage, for example, which has been continuously increasing (Hull, 1988) might have improved children's nutritional status, and this in turn may have been an associated cause of the decrease of infant mortality (Puffer, 1975). The smaller number of children would give more opportunity to the mother to have healthier children surviving, and protect them from stunting, wasting or *kwashiorkor*, forms of protein and calorie malnutrition (Martorell and Ho, 1984; Dickerson and Booth, 1985).

Both the underlying causes such as marriage arrangement, age at first marriage, the length of spacing, and marriage dissolution, and the effects such as the child-woman ratio, average number of children ever born, and the number of children surviving, wherever available, are tested in this Chapter in relationship with children's nutritional status.

5.2. Marriage

According to Hindu religion, the life cycle is divided into four *ashrama* or periods: *Brahmacari ashrama, grahasta ashrama, wanaprasta ashrama,* and *samniasa ashrama.* Marriage is part of the second period or *wanaprasta ashrama* from around age 25 until around age 50. Therefore, a Hindu, if he survived, should have married during this period, because this is the opportunity to fulfil physical, mental, and social satisfaction, such as sexual relations, having offspring, and improving social status.

5.2.1. Marriage arrangement

Ideally a person should be virgin until marriage. In Bali virginity, indicated by an intact hymen, was in the past an element of a kind of marriage known as *mepadik*[2]. On the first day when the bridegroom came to the house of the bride there was a ceremony known as *ngungkab lawang* which literally means 'to open the door'. In this ceremony the bridegroom was instructed to enter into a specially decorated bedroom where the bride was waiting. There they performed the first sexual intercourse, and when it was over, a

[2]*Mepadik* is a form of marriage with the full knowledge of the parents on both sides; *ngerangkat* or *ngerorod* is a form of marriage without the knowledge of the parents on one or both sides; *ngejuk* or *paksa* is a form of marriage by force which is an offence against the law if reported.

'specialist' was asked to examine the existence of bloodstains on the white sheet. If the 'specialist' found no bloodstains and the bride was therefore proved not to be a virgin, it was likely the marriage would be cancelled or the bride divorced soon afterward.

This was the only event at which direct queries about virginity were made. Nowadays probably the ceremony is no longer observed. Instead, people use the word *bajang genten* for woman and *teruna genten* for man to indicate that somebody is still really single and there is no way to investigate whether she or he is still virgin. Today marriage after a woman is pregnant is no longer unusual. In three wedding ceremonies that I attended in 1985, all of which ended with full-term childbirths between four and six months later, there was just as much happiness as in other families in the community organization *banjar adat*. Other cases involved teenage couples who came to my private practice to arrange a procedure of menstrual regulation, because the girl had missed a period. They wanted to terminate a pregnancy for one reason or another, such as that they were still in High School, they were not ready for a new family, or one of the family was pregnant and they believed that more than one pregnant woman in a houseyard was taboo.

These cases illustrate the social change in the acceptance of premarital sexual experience. This change which according to Hull (1988) is a product of the influence of a broad range of 'modern' ideas, indicates the potential for further and faster fertility decline in Bali should the teenagers have been using proper contraceptive methods before the accident took place.

Data on the types of marriage arrangement were collected in the 1980 IFPNP survey. There were two main types of marriage arrangement found in the survey: *mepadik* represented 52.3 per cent and *ngerorod* 46.6 per cent. The rest consisted of *paksa* 0.5 per cent and other types 0.6 per cent. The category of 'other' types was not specified in more detail. According to Kaler there were two more types of marriage arrangements, *tetagon*, a form of marriage which is arranged by the parents of the bride and groom when they are still children, although the real marriage ceremony is performed only when they reach reproductive age; and *ngunggahin*, a form of marriage when a woman asks a man to marry her. Another type is called *nyentana* where a woman acts as a man and is responsible for her parent's family tree and the man who marries her acts as a woman in terms of the responsibility to his family and family-in-law. Probably the rest belonged to one or both of these types.

The reason for the high prevalence of *ngerorod* marriage arrangement is either economics, family problems, or more importantly, traditional law. While the economic reason can be adjusted to the bridegroom's economic condition, with family problems often there is no alternative to this type of marriage. This marriage for reasons of traditional law is usually performed when intermarriage between different castes occurs or simply one or both families do not allow them to marry. There were 7.9 per cent intermarriages between different castes in the 1985 IPFNP survey. These consisted of 4.8 per cent between men of higher castes and women of lower castes, and 3.1 per cent between men of lower castes and women of higher castes. The intermarriages between castes mainly occurred in four *Kabupatens*: Jembrana, Tabanan, Badung, and Gianyar, and to a lesser extent in another four: Bangli, Klungkung, Karangasem, and Buleleng.

Ngerangkat or *ngerorod* is permitted as far as it follows the traditional requirements, such as: it does not violate age, kinship, or health requirements; they really intend to marry; at least during the first three days of marriage the spouse should stay in someone's house; as soon as possible after the woman has left for marriage the man's family should send someone called *pejati* or *pemelaku* or *penyedek* to report to the groom's family about the marriage; the owner of the house where the couple temporarily stay should report to the authorities of local communities; the bride's family can -if needed- come and check up the marriage. If all these requirements are fulfilled the marriage ceremony can continue.

5.2.2. Relationship of marriage arrangements and children's nutritional status

The percentage of older children born from *mepadik* marriage arrangements was higher than that of younger children, suggesting trends in the increase of families recently arranging *ngerorod* rather than *mepadik*. The effect of marriage arrangements on children's nutritional status can be seen from Table 5.1, where the prevalence of malnutrition was the lowest from mothers with *ngerorod* marriage arrangement. This was the case in both program *banjar* and non-program *banjar*, and also in all birth order children. Intermarriage between different castes especially between a man of lower caste and a woman of higher caste, which is called *asumundung* if the woman is from brahman or *alangkahi karang ulu* from other castes, is one of the prominent social changes among

the Hindu community in Bali. Such marriages were impossible in the past because the spouses were subject to the death penalty. Friederich (1959 [1849-50]) who lived in Bali early in the 19th century wrote his experience as follows:

> The guilty woman is burnt alive ...is called *labuh gni*, the man is weighted with stones and drowned in the sea, this is called *labuh batu*. In several cases which came to my knowledge, both the man and the woman were drowned; in another case, where the guilty man had escaped vengeance by flight, the woman, at the command of her father a *Gusti* in Kuta, was killed with the creese by a relation, her mother's brother, after having been adorned with flowers and fine clothes, and rendered fearless by opium and strong drink (Friederich, 1959: 102).

In 1951 the restriction on intercaste marriages such as *asumundung* or *alangkahi karang ulu* was relaxed on the basis of the recognition that under the national laws and regulations everyone has the same rights and should be treated the same. The reformation of the customary marital law was signed by Governor Soetedja and the Head of Province House of Representative I Gst. Putu Merta (Astiti, 1981).

5.3. Multiple regression analysis

Using the single dependent variable of children's nutritional status as the outcome (see Chapter 4), multiple regression analysis shows that some independent variables concerned with demographic characteristics were significantly correlated to children's nutritional status. The list of those variables is presented in Table 5-2.

The current age of mothers was categorized into seven five-year age groups and coded from 1 to 7. The number of children even born (CEB) and the number of surviving children were categorized into four groups and coded as follows: 1 for 1-2, 2 for 3-4, 3 for 5-6, and 4 for 7 and over. The combined current age of mothers and the number of children ever born in the 1980 IFPNP survey explained only a small percentage (two per cent) of the variation of children's nutritional status, but was highly significant. In the 1985 IFPNP survey surviving children and children ever born variables were individually more significant in explaining variation in nutritional status among older children. The combined role of the variables also explained more (three per cent) of variation in children's nutritional status but was less significant than that in 1980. The interpretation of each individual variable in relation to children's nutritional status is described in the following section.

Table 5-1. Prevalence (%) of malnutrition of children by *banjar*, birth order, and type of marriage, 1980 IFPNP survey. (WFH)

Type of banjar	Type of marriage	Prevalence (%) of malnutrition in children			
		Youngest		Older	
		%	N	%	N
Program	Mepadik	38.1	197	31.2	122
	Ngerorod	35.4	192	29.6	88
	Other	25.0	4	-	-
	Total	36.6	393	30.5	210
Non-program					
	Mepadik	37.1	213	39.0	100
	Ngerorod	37.0	173	30.5	69
	Other	60.0	5	-	-
	Total	37.3	391	35.5	169

5.4. Age at first marriage

Table 5-2. Statistical values by list of independent variables, 1980 and 1985 IFPNP surveys.

Variables	Coefficient	T-significance
	1980	
Current age of mothers	.028	.015
CEB	-.064	.042
R^2 : 0.018		
Significance : 0.0002		
	1985	
Older children		
CEB	-.288	.012
CSL	-.725	.011
R^2 : 0.031		
Significance : 0.0314		

5.4.1. Average age at first marriage

Age at first marriage is an important indicator of the possible number of births a woman can have during her reproductive period, that is from when ovulation begins which is signalled by onset of menarche or the first menstruation, until the end of menstruation which is called menopause, assuming the woman spends her full reproductive age in marriage and marriage is counted as the starting point for delivering babies. So a higher age at first marriage means the woman is less exposed to pregnancy, hence also less at risk of having children. The current age, on the other hand, can give information on the time already spent in marriage, simply by subtracting current age from age at first marriage.

From the 1971 and 1980 Censuses and the 1985 Intercensal Survey (Hull, 1988) it has

been calculated that the mean age at marriage of Balinese women increased from 20.8 years in 1971 to 21.2 years in 1980, and 22.3 years in 1985. At the same time the mean age at marriage for the whole country was slightly lower at 19.3 years in 1971, 20.0 years in 1980, and 21.1 years in 1985. Thus the age at first marriage of Balinese women was higher than the average of total Indonesian women, and both Balinese and Indonesian women showed an increasing trend in age at first marriage.

The average age at first marriage of Balinese women from the 1980 and 1985 IFPNP surveys was lower than from the Census and Intercensal Survey. There was not much difference in median and modal age at first marriage in both categories of *banjar* in 1980 and 1985. The only slight increase in mean age at first marriage was found in non-program *banjar* from 19.3 years in 1980 to 19.5 years in 1985. Slightly different from the average age at first marriage, the average of current age increased almost a year for the mean age, and five years for the mode in non-program *banjar* (Table 5-3).

Therefore, although the minimum age at first marriage has already fulfilled the requirements of the National Marital Law of 1974 which states that by the time they marry the woman should have reached at least 16 years and the man 19 years and marriage before 21 years of age should be with the parents' permission, it seems the law has not affected the age at first marriage of this population. On the role of the law in Indonesia as a whole, Hull (1988) commented that it might have largely reinforced rather than produced a change in the minimum age at marriage, since the average age at first marriage has already exceeded the minimum age required.

5.4.2. Relationship of age at first marriage and children's nutritional status

Age at first marriage grouped into under 20 years, 20-24 years, and 25 years and over in the relationship with children's nutritional status, generally showed a lower prevalence of children's malnutrition with the increase of age at first marriage. An exception was found among children in the non-program *banjar* in 1985, where higher prevalence of malnutrition was found in the age group of first marriage 20-24 years than in the age group of first marriage under 20 years. The prevalence of malnutrition decreased slightly from the age group of first marriage under 20 years to 20-24 years, but this decreased more drastically from age group of first marriage 20-24 years to 25 years and over, which

Table 5-3. The average age at first marriage and current age by *banjar*, 1980 and 1985 IFPNP surveys.

Year	Banjar	Average age (years)				
		Mean	Median	Mode	SD	N
		At first marriage				
1980	Program	19.3	19.0	18.0	2.9	581
	Non-program	19.3	19.0	18.0	3.3	626
	Total	19.3	19.0	18.0	3.2	1207
1985						
	Program	19.1	19.0	18.0	3.0	394
	Non-program	19.5	19.0	18.0	3.5	371
	Total	19.3	19.0	18.0	3.3	765
		Current age				
1980						
	Program	26.0	25.0	25.0	5.9	576
	Non-program	25.8	25.0	20.0	5.8	628
	Total	25.9	25.0	20.0	5.8	1204
1985						
	Program	26.7	25.0	25.0	5.5	426
	Non-program	26.9	26.0	25.0	5.7	403
	Total	26.8	25.0	25.0	5.6	829

occurred in both program *banjar* and non-program *banjar* and in 1980 and 1985 (Table 5-4).

Table 5-4. Prevalence (%) of malnutrition in children by mothers's age at first marriage, *banjar* 1980 and 1985 IFPNP surveys. (WFH)

Age group at first marriage (yrs)	Prevalence (%) of malnutrition in children			
	Program		Non-program	
	%	N	%	N
		1980		
<20	36.6	317	35.6	368
20-24	36.6	205	35.4	195
25+	30.3	33	31.0	92
Total	36.2	555	35.2	605
		1985		
<20	25.6	285	26.6	244
20-24	25.4	142	36.1	122
25+	15.4	26	23.9	46
Total	24.9	453	29.1	412

5.4.3. The duration of marriage

The average time since marriage for women from the 1980 and 1985 IFPNP surveys was as follows: in 1980, 6.7 years in program *banjar* and 6.5 years in non-program *banjar*; in 1985 7.5 years in program *banjar* and 7.4 years in non-program *banjar*. Women overall showed an increase in the duration of marriage from 6.6 years in 1980 to

7.5 years in 1985. Should all women in normal biological condition have spent their reproductive age naturally since marriage without dissolution such as through divorce, widowhood, or separation before menopause, the women in 1985 must have had more children than the women in 1980. This is tested later in discussing fertility and the practice of family planning.

The duration of marriage may mean several things. Longer duration may mean that the women were older at the time they were interviewed among women married at the year and at the same age at marriage; more experienced in family management, and probably more settled economically and socially than those with a shorter duration of marriage. In terms of different cohorts of age at first marriage, however, the reverse may occur. A couple with shorter duration of marriage may, in fact, be older than those with longer duration, because of higher age at marriage of the new couple. Besides, the new couple who married more recently were more likely to be educated than the older couples, so that the new couple may be more welfare-concious.

5.4.4. Relationship of duration of marriage and children's nutritional status

The duration of marriage in relationship to children's nutritional status from the IFPNP surveys showed different patterns between program *banjar* and non-program *banjar*. The durations of marriage were grouped into less than five years, 5-9 years, and 10 years and over; in the non-program *banjar* the prevalence of malnutrition in children increased as the duration of marriage increased in both 1980 and 1985. In the program *banjar*, in 1980 the prevalence of manutrition increased from marriage duration group under five years to 5-9 years and then decreased in the 10 years and over marriage duration group, however in 1985 the prevalence of children's malnutrition was lowest among the 5-9 years marriage duration group mothers (Table 5-5).

5.4.5. Marriage dissolution

Marriage dissolution has the same role as age at first marriage in restricting the chance of having children in the reproductive age period. Unlike age at first marriage, which works up, however, marriage dissolution works down, so that both will shorten the duration spent during the reproductive age. Besides, whereas age at first marriage can be

Table 5-5. Prevalence (%) of malnutrition in children by mothers' duration of marriage and *banjar*, 1980 and 1985 IFPNP surveys. (WFH)

Duration of marriage (yrs)	Prevalence (%) of malnutrition in children			
	Program		Non-program	
	%	N	%	N
		1980		
<5	38.5	252	32.0	281
5-9	31.9	160	37.4	174
10+	37.1	143	38.6	153
Total	36.2	555	35.2	608
		1985		
<5	24.0	183	26.5	132
5-9	26.5	151	26.9	134
10+	25.0	160	31.1	177
Total	25.1	494	28.4	443

delayed both voluntarily such as in studying and forcibly such as in using contraception[3],

[3]The delay of age at first marriage by using contraceptive methods can be explained as follows: traditionally, having sexual intercourse before marriage is not accepted in Bali. However, nobody can be sure of whether a person has already had sexual intercourse unless a woman becomes pregnant. If this occurs the pregnant woman must marry the man responsible for the pregnancy. Nowadays, it is possible to prevent a woman from getting pregnant by using contraceptive methods, and thus avoid her being forced to marry younger. The use of contraception, including menstrual regulation, in this case can, therefore, delay age at first marriage. A colleague of mine, for example, one day in 1984 did a menstrual regulation for a girl who was still in the sixth year of Primary School. After having menstrual regulation procedures, the girl was given Pill to prevent her from getting pregnant again, so she continued going to school and did not worry about being forced to marry at an early age

marriage dissolution usually occurs unintentionally, so its potential in lowering fertility cannot be counted on.

Marriage dissolution is usually in the form of divorce or widowhood. As mentioned in Chapter 2, Balinese maintain the marriage as long as possible even if a woman in specific conditions is not to be the only wife. When a field trial of the 1985 IFPNP survey was conducted in a village of *Kecamatan* Abiansemal, I met a woman who I supposed to be the respondent. I was a bit confused because she was already over 50[4], with a child of three years old. Before the interview started she told me that she had encouraged her husband to marry another woman because she herself was infertile. When a child was born to the new wife she treated the child as her own. After telling the story she went to look for the real respondent who was working in the garden.

Unlike the trend of increase in national and provincial age at marriage, the prevalence of marriage dissolution tends to continue declining (Hull, 1988). While the prevalence of widowhood is declining because spouses live longer and widows marry more quickly, the decline of the prevalence of divorce may have been the effect of the National Marital Law of which one aspect is to prevent a husband marrying polygynously; the other possible reason is the increase in age at first marriage which guarantees a more mature wife to build a new family. The number of 'never married' cases by the time women reach their 30s in Bali has always been low because of the strong support of the culture for marriage. One of the references on religion used by Balinese Hindus contains the obligation of both husband and wife to always try to keep a prosperous, respected, and long-lasting marriage (Astiti, 1981).

The information on marriage dissolution from the surveys is only available from 1985. There was no widowhood found in the survey, only 0.7 per cent were divorced, and 0.1 per cent separated. If marriage is dissolved it is likely that remarriage will occur; this remarriage information is available from both the 1980 and 1985 IFPNP surveys. The finding suggests that there was not much difference in remarriage prevalence at the two

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[4]Delivering a baby late in the reproductive age is really unusual at present in Bali. In 1976 there was a case at *desa* Timpag of *Kabupaten* Tabanan when a woman of about 44 years delivered her baby by herself, when nobody knew she was pregnant. Later it was known that this happened only because the woman was very ashamed to be pregnant at her age and she had dressed in such a way that nobody could recognize her pregnancy.

points of time. Most women married once, 96.5 per cent in both 1980 and 1985; those who married twice were 3.4 per cent in 1980 and 3.2 per cent in 1985, and only a tiny fraction married three times or more: 0.1 per cent in 1980 and 0.3 per cent in 1985, four times only in the 1985 survey, 0.1 per cent. These remarriage rates suggest that no change in marriage dissolution occurred between 1980 and 1985.

Information was also collected in the 1980 IFPNP survey about the practice of polygyny. The prevalence of polygynous households was 4.3 per cent, which for most wives represented their first marriage (Table 5-6). The practice of polygyny may be related to the excess of females over males in the reproductive ages between 15 and 49 years, which was reflected by the sex ratio of 89 men to every 100 women in 1980 (CBS, 1980).

5.4.6. Relationship of mothers' frequency of marriage and children's nutritional status

In relation to children's nutritional status, there was an indication that children of mothers in polygynous marriages suffered more from malnutrition. The prevalence of malnutrition, using weight by height assessment, was 40.4 per cent for children of polygynous marriages compared to 35.5 per cent for those of non-polygynous marriages. However, the difference does not have much influence on the prevalence of malnutrition for total children because of the minor proportion of mothers married more than once.

5.5. Fertility

Data collected through censuses,intercensal population surveys, and sample surveys revealed that the average number of children born alive among Balinese women has been declining. This can be seen from various indicators commonly used in demography such as child-woman ratio[5], crude birth rate[6], and total fertility rate, a hypothetical total number of children born in the completed child-bearing ages of a woman.

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[5]This is the proportion of children aged 0 to 4 per 1,000 women of childbearing age, i.e., 15 or 20 to 44 or 49 (CBS, 1980).

[6]This is the total number of live births in a population during a given period in every 1000 population during the same period. The total population used as the denominator is usually taken at the midpoint of the period and hence it is sometimes called central birth rate (CBS, 1980).

Table 5-6. Distribution (%) of mothers by frequency of marriage and number of husband's wives.

No. of wives	Frequency of marriage 1	2	3	Total %	N
1	96.5	3.4	.1	100.0	1158
2	95.9	4.1	-	100.0	49
3	100.0	-	-	100.0	1
4	100.0	-	-	100.0	1
6	100.0	-	-	100.0	1
Total %	96.5	3.4	.1	100.0	
N	1168	41	1		1210

The child-woman ratio[7] for every 1000 women among Balinese women declined from 723.2 in 1971 to 514.4 in 1980, and declined further to 406.6 in 1985. In the same period the child-woman ratios for Indonesia were 667.3, 589.6, and 530.6[8], respectively, indicating a smaller decline than in Bali over the last two decades.

The IFPNP surveys indicated the same trends, with the child-woman ratio declining

[7]The denominator of this ratio is women aged 15 to 49 years.

[8]The child-woman ratios for 1971 and 1980 were obtained from Statistical Profile of Mothers and Children in Indonesia, CBS, Jakarta, 1983; and for 1985 were calculated from the 1985 Intercensal Population Survey, CBS, Jakarta, 1987.

from 961.1 in 1980 to 888.4 in 1985. The high child-woman ratio of the IFPNP surveys is clearly caused by the use of only fertile married women - except a few of the first pregnant women - as the denominator, whereas the censuses used all women of childbearing age, including unmarried, infecund, and sterile women. Infecundity differs from sterility in that it denotes incapacity to produce a live birth, while sterility denotes the lack of reproductive function such as ovulation in women or spermatogenesis in men.

5.5.1. Children ever born

The number of children ever born in both the 1980 and 1985 IFPNP surveys was high in each age group of women. This is consistent with the child-woman ratio. Using the age group up to 40-44 years because of a very small number of women aged over 44 years, the average number of children ever born started at over one both in 1980 and 1985. This reached over seven in 1980 and over six in 1985 at the last age group. All age groups, except 25-29, exhibited a decline in the average number of children ever born from 1980 to 1985. The average of total children ever born was 2.98 in 1980 and 2.76 in 1985 (Table 5-7).

5.5.2. Relationship of children ever born and children's nutritional status

The relationship between children ever born and children's nutritional status is shown in Table 5-8. There was no similar pattern of the relationship between the number of children ever born with the prevalence of children's malnutrition in the youngest children and older children, in program *banjar* and non-program *banjar*, and in 1980 and 1985. Among the youngest children, for example, in 1980 the lowest prevalence of malnutrition was among mothers having 3-4 children ever born in the program *banjar*, and among mothers having 1-2 children ever born in the non-program *banjar*; in 1985 the lowest prevalence of malnutrition was among mothers having five and over children ever born in the program *banjar*, but among mothers having 1-2 children ever born in the non-program *banjar*. In the non-program *banjar* in 1980 the prevalence of children's malnutrition both among the youngest and older children increased among mothers having higher number of children ever born, however in 1985 this decreased in the youngest children in the program *banjar*.

Multiple regression analysis shows highly significantly ($P< 0.01$) negative correlation

Table 5-7. Average children ever born (CEB) by age group of women, IFPNP, 1980 and 1985.

	1980			1985		
Age group	No.of women	No.of ceb	Aver. ceb	No.of women	No.of ceb	aver. ceb
15-19	70	89	1.271	31	34	1.097
20-24	420	734	1.748	297	469	1.579
25-22	316	554	2.741	257	674	2.623
30-34	180	316	4.250	145	557	3.841
35-39	104	183	5.644	75	379	5.053
40-44	45	79	7.600	28	184	6.571
Total	1135	3383	2.981	833	2297	2.758

between the number of children ever born and the prevalence of malnutrition in older children in 1985 IFPNP survey, and significantly ($P < 0.05$) negative correlation between the number of children ever born and the prevalence of malnutrition in the total children in the 1980 IFPNP survey.

Table 5-8. Prevalence (%) of malnutrition in children by birth order and children ever born, 1980 and 1985 IFPNP surveys.
(WFH)

CEB	Prevalence (%) of malnutrition in children							
	Program				Non-program			
	Youngest		Older		Youngest		Older	
	%	N	%	N	%	N	%	N
	1980							
1-2	39.3	183	32.2	87	32.6	193	33.6	116
3-4	37.6	93	24.4	41	34.0	97	39.0	41
5+	38.3	81	33.3	36	36.0	81	42.1	38
Total	38.7	357	30.5	164	35.6	371	36.4	195
	1985							
1-2	24.7	190	31.6	76	27.9	165	17.2	58
3-4	24.5	94	21.1	38	35.0	100	30.8	39
5-6	20.8	38	42.9	21	28.9	45	25.0	16
Total	24.1	332	30.4	135	30.3	310	23.0	113

CEB = the number of children ever born

5.5.3. Total fertility rate

In countries where vital registration is lacking or incomplete such as in Indonesia total fertility is usually estimated by various indirect methods from available data sources such as censuses, intercensal population surveys, and sample surveys.

Hull and Dasvarma (1987) presented evidence of continuing fertility decline in Indonesia, using the own-children and last-birth methods. During the last two and a half decades the fertility rate of the whole country has declined from more than 5.5 in the period 1967-70 to less than 3.5 in 1985. The sharpest decline occurred between 1980 and 1985 when the annual percentage decline was more than twice that in the period 1967-70 to 1980. Two provinces, Bali and North Sulawesi, are interesting in their competition to achieve a fertility rate lower than the national average, both having experienced a higher than national average in 1967-70, while two other provinces, West Java and West Nusa Tenggara, are interesting in retaining the highest fertility rate among their group regions (Table 5-9).

The average number of last live births during the last full year prior to data collection of both the 1980 and 1985 IFPNP surveys was very high, which is not surprising since the denominator is all fertile and married women, except for a few of the first-pregnant women. In order to estimate the total fertility of this population, which consists only of households with pregnant and lactating women, an adjustment is required. One of them is made by employing the proportion married and the proportion fecund in each age group of childbearing age women. Since the total fertility rate represents only the population of pregnant and lactating women, the proportion of this population is also required. Fortunately all of the required data are available from different sources.

Streatfield (1985: 6) estimated the prevalence of women three months or more pregnant in Bali in 1980 to be 1.45 per cent or about two per cent including the first three-month pregnant women from total population . The prevalence increased to seven per cent, using the proportion of women of childbearing age in the 1980 census as the denominator. In the 1985 IFPNP survey where the number of pregnant and lactating women was taken proportionally, there was one pregnant woman for every five lactating women. The proportion of pregnant and lactating women, therefore, was 42 per cent of total women of childbearing age.

Table 5-9. Total fertility rates by provinces, from 1967 to 1985, Indonesia.

Region	1967-70	1980	1985
Sumatra	6.54	5.22	4.04
D.I. Aceh	6.27	4.19	3.64
North Sumatra	7.20	5.40	4.17
Riau	5.94	5.30	4.07
Jambi	6.39	5.11	3.30
South Sumatra	6.33	4.24	3.58
Bengkulu	6.72	5.76	3.88
Lampung	6.36	5.40	4.30
Java	5.26	3.89	2.92
D.K.I. Jakarta	5.18	3.94	2.18
West Java	5.94	4.47	3.34
Central Java	5.33	4.08	3.03
D.I. Yogyakarta	4.76	3.25	2.44
East Java	4.72	3.27	2.58
Nusa Tenggara			4.22
Bali	5.96	3.50	2.53
West Nusa Tenggara	6.66	5.55	5.58
East Nusa Tenggara	5.96	5.15	4.40
East Timor			4.56
Kalimantan	5.89	4.61	3.38
West Kalimantan	6.27	5.00	3.42
Central Kalimantan	6.83	5.20	3.42
South Kalimantan	5.43	3.99	3.32
East Kalimantan	5.41	4.51	3.27
Sulawesi	6.02	4.52	3.55
North Sulawesi	6.79	3.89	2.66
Central Sulawesi	6.53	5.76	3.82
South Sulawesi	5.71	4.43	3.53
Southeast Sulawesi	6.45	5.70	5.15
Maluku	6.89	6.08	4.26
Irian Jaya		4.11	3.58
Indonesia	5.61	4.27	3.28

Source: Hull, 1987.

The 1980 census and 1985 intercensal data of Bali showed the following proportions of married women: in age group 15-19 years, 20 per cent in 1980, and 10 per cent in 1985; in age group 20-24 years, 70 per cent in 1980 and 60 per cent in 1985; in the age group 25 years and over, the proportion was 90 per cent. The fecundity schedule (Table 5-10) is taken from the standard age-specific proportions of fecund used as a complement in measuring the impact of Family Planning Programmes on Fertility proposed by Bongaarts (UN, 1986).

Table 5-10. Standard age-specific proportions of fecund by age group of women.

Age group	Proportion fecund
15-19	0.98
20-24	0.98
25-29	0.97
30-34	0.96
35-39	0.89
40-44	0.75
45-49	0.38

Source: Bongaarts 1986.

The estimate of the total fertility rate of pregnant and lactating women from the 1980 and 1985 IFPNP surveys is made by using the last birth method. The steps of the calculation are as follows: first, calculate the average number of children born alive during the last full year in each age group; second, calculate the age-specific multiplying

factors by multiplying the prevalence of lactating and pregnant population with proportion of married and the age-specific proportion of fecund (Table 5-11). The prevalence of lactating and pregnant population is assumed to decline 7.5 per cent from 1980 to 1985, using the decline of child-woman ratio in the IFPNP surveys, from 961.1 in 1980 to 888.3 in 1985.

Table 5-11. Age-specific multiplying factors, 1980 and 1985.

Age group (1)	1980 mr (2a)	1980 fc (3a)	1980 mf= (2a+3a) X 0.42*)	1985 mr (2b)	1985 fc (3b)	1985 mf= (2b+3b) X 0.39*)
15-19	0.2	0.98	0.08	0.1	0.98	0.04
20-24	0.7	0.98	0.29	0.6	0.98	0.23
25-29	0.9	0.97	0.37	0.9	0.97	0.34
30-34	0.9	0.96	0.36	0.9	0.96	0.34
35-39	0.9	0.89	0.34	0.9	0.89	0.31
40-44	0.9	0.75	0.28	0.9	0.75	0.26

Note: mr: Proportion of married women calculated from census and intercensal data.
fc: Bongaarts's age-specific rates of fecundity.
*): Prevalence of pregnant women, using Streatfield's estimate.
mf: Multiplying factors.

The estimated total fertility of pregnant and lactating women of the 1980 and 1985 IFPNP surveys, employing the multiplying factors (mf) for 1980 and 1985, is shown in Table 5-12. So this is only the total fertility of the pregnant and lactating population, which is estimated to be 42 per cent of all childbearing and married women in 1980 and 39 per cent in 1985. The estimated TFR is 3.9 in 1980 and 2.3 in 1985. The other women would probably share a minor proportion of the age-specific fertility schedule, because there are about two per cent of women who do not breastfeed their children (WFS, 1981), and women whose last born infant has already died. If the fertility of these women is combined with that of the pregnant and lactating, it will give the estimate of total fertility of the total population.

In the 1985 IFPNP survey, data on women who were neither pregnant nor lactating were also collected, but not in 1980. The age-specific fertility schedule calculated from those women amounts to only 0.29 of total fertility. So the estimated total fertility rate including neither pregnant nor lactating women would be 2.59. This level is slightly higher than the estimate made by Hull for Bali in 1985. The two sources are certainly in agreement that the fertility rate in Bali was likely to be lower than 3 in 1985.

5.6. Infant and child mortality

5.6.1. Number of still living children

The average number of surviving children out of the number of children ever born from mothers, excluding the first pregnant women, decreased from 2.71 in 1980 to 2.55 in 1985 in the program *banjar* and from 2.57 in 1980 to 2.53 in 1985 in the non-program *banjar* of the IFPNP surveys. However, the average number of children ever born was higher in the program *banjar* than in the non-program *banjar* both in 1980 and in 1985 and the decline was higher in the program *banjar* than in the non-program *banjar*, with the result that the proportion of surviving children in the program *banjar* was slightly higher than in the non-program *banjar*.

Table 5-12. Estimate of age-specific fertility rate, 1980 and 1985 IFPNP surveys.

Age group	1980				1985			
	W	Lb	Aver. Lb	ASFR X mf	W	LB	Aver. Lb	ASFR X mf
15-19	70	45	.643	.051	31	13	.419	.017
20-24	420	177	.421	.122	297	124	.418	.096
25-29	316	108	.342	.127	257	88	.342	.116
30-34	180	74	.411	.148	145	42	.290	.100
35-39	104	41	.394	.134	75	17	.227	.070
40-44	45	19	.422	.118	28	7	.250	.065
Total	1135	464		.700	833	291		.464
TFR				3.5				2.3

W =number of women
Lb=number live-births
mf=multiplying factors

5.6.2. Relationship of the number of still living children and children's nutritional status

The number of surviving children grouped into 1-2 children, 3-4 children, and five children and over revealed that in 1980 the highest prevalence of children's malnutrition was found among surviving children group five and over in both the program *banjar* and the non-program *banjar* and in the youngest children and older children. In 1985 this was

also found among older children in the program *banjar*. The lowest prevalence of malnutrition in the 1-2 surviving children group was found among youngest children in program *banjar* in 1980, older children in non-program *banjar* in 1980, and in the non-program *banjar* in 1985 both the youngest and older children (Table 5-13).

Table 5-13. Prevalence (%) of malnutrition in children by number of surviving children and *banjar* 1980 and 1985 IFPNP surveys. (WFH)

Number of surviving children	Prevalence (%) of malnutrition in children							
	Program				Non-program			
	Youngest		Older		Youngest		Older	
	%	N	%	N	%	N	%	N
				1980				
1-2	37.2	196	31.5	92	33.7	208	33.3	126
3-4	37.5	104	27.3	44	30.6	98	40.9	44
5+	43.6	55	47.4	28	49.2	63	45.8	24
Total	38.3	355	30.5	164	35.5	369	36.6	194
				1985				
1-2	24.7	190	31.6	76	27.9	165	17.2	58
3-4	24.5	94	21.1	38	35.0	100	30.8	39
5+	20.8	48	42.9	21	28.9	45	25.0	16
Total	23.9	332	30.8	135	31.3	310	23.0	113

Multiple regression analysis shows highly significantly ($P < 0.01$) negative correlation

between the number of surviving children and the prevalence of malnutrition in older children in the 1985 IFPNP survey.

5.6.3. Estimate of infant and child mortality rates

Although vital registration has been implemented since 1880 (St. Bl. No. 81, 1880) it has not yet been seriously enforced (Soedarjono, 1957) resulting in incomplete vital information. Fortunately, while data from vital registration are still not available various indirect methods can now be used to estimate the level of mortality. The results suggest that infant and child mortality - in line with fertility - has been continuously declining.

Taylor (1983) argues that economic improvement of the community will spontaneously reduce mortality. But she pointed out that some populations with low per capita income have proved to be able to reduce mortality significantly, for example, Sri Lanka, Kerala (India), and Burma. Besides, Taylor found strong correlation between fertility and infant and child mortality; she believes that the high priority given by the National Health System (SKN) to reducing infant mortality to below 45 and child mortality to lower than 15 by the year 2000 (Bali Provincial DOH, 1984) combined with the effective use of family planning practices will undoubtedly reduce infant and child mortality dramatically.

On the other hand, agricultural technology, which has transformed Indonesia from an importer to a self-sufficient producer of the main staple, rice, has increased the achievement of the minimum necessary calorie requirements. Before 1970, for example, the calories per person per day were between 17 and 25 per cent less than the minimum amount required, and the protein per person per day between 28 and 30 per cent less (Table 5-14) than the minimum amount required (FAO, 1971); but in 1981 the daily per capita calorie intake already exceeded by 10 per cent the minimum amount required (UNICEF, 1985).

Since Independence, estimates derived mainly from censuses and intercensal population surveys have revealed the decline in infant mortality per 1000 live births for Indonesia from 143 in 1971 to 107 in 1980 (Soemantri, 1983) and to 72 in 1985. In the same period for Bali it declined from 127 in 1971 to 88 in 1980 and to 64 in 1985 (Streatfield and Larson, 1987a). The IFPNP surveys' infant and child mortality rates, using the Brass method are shown in Table 5-15.

Table 5-14. Levels of food consumption and nutrition, Indonesia, 1961-1970.

Reference period	Daily per cap. calories consumed	Minimum calories required	Per cent deficient
1961-1963	1930	2350	17.9
1964-1966	1920	2350	18.3
1967-1969	1780	2350	24.3
1970	1920	2350	18.3
1976	2231		
1981*)			110.0
1985**)			109.0

Reference period	Daily per cap. gr. protein consumed	Minimum Protein required	Per cent deficient
1961-1963	42.5	60	29.2
1964-1966	42.3	60	29.5
1967-1969	40.1	60	33.2
1970	42.8	60	28.7

Sources: McDonald, 1976 (FAO, 1971).
*) UNICEF, 1985.
**) UNICEF, 1988.
Note : Stated as % of requirements.

The value of multiplying factor using P2/P3 for 1980 is actually 0.637 but since this value is outside of the standard table, the maximum value 0.616 in the standard table is

Table 5-15. Estimated infant and child mortality rates, IFPNP 1980 and 1985 surveys.

Age group	No.of women	Aver. CEB	Aver. CSL	Prop. child. dying	Mf P2/P3	Prop. child dying under exact age	Age
			1980		.616*)		
15-19	70	1.271	1.171	0.0786	.859	.0676	1
20-24	420	1.748	1.593	0.0886	.938	.0832	2
25-29	316	2.741	2.497	0.0890	.948	.0844	3
30-34	180	4.250	3.706	0.1280	.961	.1230	5
			1985		.602*)		
15-19	31	1.097	1.032	0.0593	.870	.0516	1
20-24	297	1.579	1.448	0.0830	.946	.0785	2
25-29	257	2.623	2.385	0.0907	.953	.0864	3
30-34	145	3.841	3.324	0.1346	.975	.1312	5

*) the P2/P3 value from the standard table

used. The infant mortality rates from IFPNP surveys declined from 67.6 per 1000 live births in 1980 to 51.6 per 1000 live births in 1985. These are lower than those estimated from census and intercensal data in the same year.

Although the estimated infant mortality rates declined from 67.6 per 1000 live births in 1985 to 51.6 per 1000 live births in 1985 and the estimated mortality rates of children

under two years declined from 83.2 per 1000 in 1980 to 78.5 per 1000 in 1985, the estimated mortality rates of both children under three years and under five years increased from 1980 to 1985. According to Santow (1983: 242) this is one of the defects of estimating infant and child mortality rates using the Brass, Sullivan or Trussell methods because these methods are mainly based on the proportion of children dying at certain age of mothers.

Assuming that infant mortality rates are the most reliable for estimating mortality rates of older children aged under five years, using general pattern and both sexes combined Model Life Table (WHO, 1982: 260), the 67.6 per 1000 live births estimated infant mortality rate of 1980 is located in the Survivors Table, under age two years between 92308 and 91833, under age three years between 91681 and 91149, and under age five years between 90982 and 90386; the 51.6 per 1000 live births estimated infant mortality rate in 1985 is located between 94108 and 93668 for children aged under two years, between 93677 and 93198 for under three years, and between 93203 and 92673 for under five years. Using a simple interpolation method, the estimated mortality rates of children aged under five years were calculated as follows: in 1980, under two years 82.5, under three years 86.9, and under five years 94.4; in 1985, under two years 59.8, under three years 64.2, and under five years 69.0. So the two methods for estimating the infant and child mortality rates suggest that the 1980 data were likely to be more consistent than the 1985, and that mortality rate of children under five years of age from the population of lactating mothers and pregnant women was under 100 in 1980. At the same time the level of life expectancy at birth increased from 61.3 years in 1980 to 65.8 years in 1985.

5.7. Conclusion

Marriage arrangements suggest tremendous changes from the past in terms of intercaste marriages, and marriage by *ngerorod*. Beside the tendency for both of these types of marriage to increase, there appears to be a correlation between these types of marriage and better nutritional status of children. This is particularly interesting because so far marriage arrangement by *mepadik* has been considered the best. Two advantages of *ngerorod* over *mepadik* are the greater independence of young people to choose their own spouses, and that it is economically more efficient. Another change in marriage arrangements is that virginity is not necessarily the most important requirement at the time of performing the wedding ceremony.

Age at first marriage in the IFPNP surveys did not change very much from 1980 to 1985; this differs from the census and intercensal population survey where age at first marriage shows an increase of almost one year (Hull, 1988). However, the duration of marriage calculated from the difference between current age and age at first marriage did show an increase of almost one year; according to Hull (1988) one of the causes is the increase in husband's survival which affects the likelihood of wives being widowed earlier. The increase in the average duration of marriage from 1980 to 1985 contrasted with the decline in the average number of children ever born in the same period, suggesting better birth control practice by women in the 1985 than in the 1980 IFPNP surveys.

Thus, the IFPNP surveys do not show that age at first marriage was important in the fertility decline especially from 1980 to 1985. However, the cross-sectional data analysis showed that in general mothers married at a higher age were likely to have children with better nutritional status, acoording to both 1980 and 1985 IFPNP surveys. Longer duration of marriage, on the other hand, did not necessarily improve nutritional status of children. This was possibly because shorter duration of marriage may have some advantages over longer duration such as the likelihood of having fewer children, being more educated and having a higher age at marriage if the marriage was performed more recently, resulting in a better preparation to establish a new family.

Children ever born to women and the child-woman ratio in the IFPNP surveys both show a decline of 7.5 per cent from 1980 to 1985. This same percentage decline of both fertility indicators suggests the consistency of the decline. It is very likely that total fertility in Bali has fallen lower than 3.0 which means a faster achievement than expected by the National Family Planning Co-ordinating Board with its target of 2.9 in 1990. There was no general pattern of the relationship between the number of children ever born with nutritional status of children. In 1980 the U-shape, that is the lowest prevalence of malnutrition among the second group of children ever born, was found in the program *banjar* among both the youngest and older children. The U-shape was also found among older children in the program *banjar* in 1985.

Among children in the non-program *banjar* in 1980, the prevalence of malnutrition increased with the higher number of children ever born among both the youngest and

older children. Among the youngest children in the program *banjar* in 1985 the prevalence of malnutrition decreased with the increase in the number of children ever born. So the cross-sectional data analysis reveals no clear relationship between the number of children ever born and children's nutritional status. However, the decline in the number of children ever born longitudinally from 1980 to 1985 suggests its influence on the improvement of children's nutritional status.

The estimated age specific fertility rates showed a monomodal inverse-U shape in both the 1980 and 1985 IFPNP surveys. The peak of the age specific fertility rates was in the age 30-34 years in 1980 and shifted to the younger age group 25-29 years in 1980. However, all age specific fertility rates in 1985 were lower than those in 1980, suggesting an earlier birth control practised by mothers. The highest decline in the age specific fertility rates in the age group 15-19 years from 1980 to 1985 suggested more effort to delay the first births in 1985 than in 1980. The estimated total ferility rate declined quite drastically from 3.5 in 1980 to 2.3 in 1985. The longitudinal declines in the age specific fertility rates and the total fertility rate may indirectly have important roles in the improvement of the nutritional status of children from 1980 to 1985.

The cross-sectional data analysis of the average number of surviving children in the relationship with children's nutritional status showed a similar pattern to that of the average number of children ever born. The number of surviving children grouped into 1-2, 3-4, and five and over showed a U-shape relationship with children's nutritional status among older children in the program *banjar* and among the youngest children in the non-program *banjar* in 1980 and among older children in the program *banjar* in 1985. A inverse U-shape was found among children in the non-program *banjar* in 1985 for both the youngest and older children. Among the youngest children in the program *banjar* and older children in the non-program *banjar* in 1980, the prevalence of malnutrition increased with the increase in surviving children, however, the reversal was found among youngest children in program *banjar* in 1985. So in general there was no clear relationship between the number of surviving children and children's nutritional status.

The estimated infant and childhood mortality rates using Brass and Model Life Table methods revealed a decline of 23.7 per cent in infant mortality rate from 1980 to 1985 in the IFPNP surveys. Estimating child mortality rates from the estimated infant mortality

rate, using Model Life Table method found that mortality rates of children aged under five years were already below 100 per 1000 in 1980. The increase in the level of life expectancy at birth from 61.3 years in 1980 to 65.8 years in 1985 revealed the increase of physical quality in the same period. This may indirectly have an important role in the improvement of children's nutritional status from 1980 to 1985.

Multiple regression analysis shows that the number of children ever born was highly significantly ($P< 0.01$) and negatively correlated with the prevalence of malnutrition in older children in the 1985 IFPNP survey, and significantly ($P< 0.05$) and negatively correlated with the prevalence of malnutrition in the total children in the 1980 IFPNP survey. In the 1985 IFPNP survey a highly significant ($P< 0.01$) negative correlation was found between the number of surviving children and the prevalence of malnutrition in older children.

Chapter 6

Influences of family planning practice on children's nutritional status

6.1. Introduction

The steady increase in contraceptive prevalence levels in all parts of Indonesia, especially from 1980 to 1985 (Streatfield and Larson, 1987b) has played an important role in controlling fertility. The organized family planning program begun by the Soeharto government has been a major factor in this increase in contraceptive practice (Hull, 1987). Studies conducted in various parts of the world have concluded that parity has a direct relationship to children's health condition (Puffer and Serrano, 1975; Taylor, 1983); accordingly, the fertility decline in Indonesia may have directly improved the average nutritional status of children.

The prevalence of contraceptive use in Bali in 1985 was exceeded only by that in the province of North Sulawesi (Streatfield and Larson, 1987b: 7). Hull (1978) attributed the attainment of the high contraceptive prevalence levels, specifically of IUDs in Bali, to various reasons including the extensive service networks, the common acceptance of males giving obstetrical and gynaecological examinations, and the activity of the strong community organization *banjar* in disseminating the family planning program. There is also evidence of the potential preferences of Balinese for a small and prosperous family norm (Department of Religion and BKKBN, 1983).

This chapter focuses, in the first instance, on the existing tradition and belief supporting the acceptance in family planning in Bali. The role of the acceptance in family planning in declining fertility is tested. As mentioned in Chapter 5, despite the decline in fertility from 1980 to 1985, there was no difference in the average age at first marriage and the average duration of marriage in 1985 was even longer than in 1980. More importantly the variables of knowledge and practice of family planning are tested in their relationship with children's nutritional status. Multiple regression analysis is used in addition to the

chi square to capture the more specific variables associated with children's nutritional status.

6.2. Community conditions favourable to family planning

6.2.1. Number and sex of children

There is a time reference in the Hindu religion called *Yuga*. The present age is called *Kali yuga*, which is the fourth following the first three which were called *Kerta yuga*, *Traita yuga*, and *Dwapara yuga*. During the first three *yugas* the ratio of population to area including natural resources was still low and so a large population was necessary in order that mankind would be able to continue surviving. In this *Kali yuga*, however, the population has grown too large, so a smaller number is needed for an appropriate standard of living. The period of each *Yuga* is different, the previous *Yuga* is twice than next. *Khresna*, for example, believed to be born about 50,000 years ago was in the *Dwapara yuga*. If the 50,000 years was the duration of the *Dwapara yuga*, then the present *Kali yuga* will last for 25,000 years.

Some authors believe that the number of four children in a family may be the ideal size, which is associated with the birth-order names given to Balinese infants up to only four: Wayan, Made, Nyoman, and Ketut. The number four is also supported by those who believe that an only child will be lonely, two children will always quarrel, three children are an odd number which is dangerous, so four is the best. Others have argued in favour of two instead, which is associated with one of the natural phenomena called *rhuwa bhinneda*, the two opposing things, such as day and night, west and east, up and down; accordingly, the number of two children of different sexes is the best. This is supported by the two names, *Raka* for males and *Rai* for females. In Balinese *raka* also means older brother or sister and *rai* little brother or sister (Ranoeh, 1947). Another source dealing with the number of children is the Hindu religion, which recommends the choice of an excellent only child instead of many unqualified children.

The 1985 Integrated Family Planning and Nutrition Program (IFPNP) survey showed that only 29.1 per cent of women (excluding 3.6 per cent who answered 'do not know' or 'no decision') still wanted more children. The average number of additional children

wanted was 0.48. If the ideal number of children can be said to be the total number of children still living, 2.46 as shown in Chapter 5, plus the average number of children still wanted, 0.48, then the ideal average number of children in the 1985 IFPNP survey was 2.9. This is lower than the 3.7 found in the 1973 Fertility and Mortality Survey (Lembaga Demografi, FE-UI, 1974), suggesting a change in ideal family size over the 12 year period.

The preference regarding sex of children can be viewed from different angles such as the belief, and function of children in the community. The belief in *rhuwa bhinneda* convinces that having children of two different sexes is the most ideal, because this is complete and balanced according to the belief. While the preference on the basis of belief is similar for all Balinese, the function on the other hand can vary between one community and another. A mother of six male children in the village of Songan, when asked why she still needed a child, answered: 'Later in my life if I am getting old, there will be nobody to carry offerings to the temple'. This answer can represent the attitude of Balinese in general, particularly when girls are needed to carry beautiful decorated offerings (*peed*) on their heads, not only when they are going to the temples but also in other religious festivals. A sacred dance in a temple festival called *rejang* is only performed by women or girls. Women are also specialists in preparing offerings called *raka-raka* and particularly in arranging the decorations made mainly from the leaves of coconut, palm, and banana combined with various colourful flowers. An example of the eagerness for having a girl is a colleague of mine who has kept having children up to five, because the expected girl has never come.

The preference for having a boy is common to Balinese for religious and traditional reasons (see Chapter 2). Besides, because of the specific jobs that should be done, local communities also have different views regarding the need for having male children. In peasant families, for example, jobs such as ploughing the wet or dry fields, and regulating the streams of water for irrigation are done by men. In religious or temple festivals, while women are busy arranging and decorating materials for offerings, men who are the members of the food preparation club called *Sekeha pebat* are responsible for cooking. Other special jobs that should be carried out by men during a temple festival include playing the musical instruments, *gamelan* or *gong gede*, beating the wooden drum, performing the sacred dance called *baris jojor*, and cleaning the temple before and after

the festival. In the village of Terunyan, funeral ceremonies are carried out only by men because women are not allowed to come to the cemetery.

6.2.2. Preference for IUD (Intra Uterine Device)

Since the implementation of the family planning program in the 1970s, IUDs have been the most popular method used in Bali. In terms of the preference in the use of contraceptive methods this is unique, because women in other parts of Indonesia prefer to use systemic methods such as the oral pill. This fact is supported by both the population censuses and the survey data. In the 1980 population census (CBS, 1980), for example, the IUDs were 63.7 per cent of all methods used by Balinese women compared to only 24.2 per cent of Indonesian women. The pill was used by only 12.4 per cent of Balinese women compared to 55.8 per cent of Indonesian women. In the 1985 Intercensal Population Survey (CBS, 1985), IUDs were 70 per cent of all methods used by Balinese women compared to 30.9 per cent of Indonesian women whereas the pill was used by only 9 per cent of Balinese women compared to 39.9 per cent of Indonesian women.

The preference for using IUDs was also evidenced in the surveys (Table 6-1). Presented as the percentage of all methods currently used, IUDs were already dominant in 1973 (Lembaga Demografi, FE-UI, 1974), in 1979 (Dela et al., 1982), and in the 1980 and 1985 IFPNP surveys.The use of IUDs from the IFPNP surveys was consistent with that from the 1980 census and the 1985 IPS. In the 1985 IFPNP survey, which used a closed questionnaire, most women said that the reason for choosing the first method they used was because it was 'most convenient' or '*cocok*' in Indonesian. Actually, *cocok* can have several meanings such as practical, efficient, or wanted.

Balinese women regard the IUD as practical because they do not need to remember the exact and frequent times to use other methods such as the oral pills, or to face a high risk of pregnancy otherwise. It is efficient because once a woman has the IUD inserted she will be quite safe in having sex for a long period of time and have a better chance to plan for the next pregnancies, unless unwanted side-effects occur. In terms of procedure of inserting IUD, there is not much objection to whether it is performed by male or female health personnel, which may be related to the fact that there are more male than female traditional birth attendants in Bali. For example, a study on the safe use of the Cu-380-

Table 6-1. Distribution of contraceptive methods used in Bali by year and method.

Contraceptive method	Percentage			
	1973 (a)	1979 (b)	1980 (c)	1985 (d)
IUD	77.2	75.4	63.2	70.9
Pill	22.1	13.5	22.0	8.1
Condom	1.0	6.7	10.0*)	2.7
Injection	-	1.3	0.9	9.1
Tubectomy	-	2.0	3.3	8.1
Vasectomy	-	0.3	-	0.3
Other	9.7	0.7	0.6	0.7
Total %	100.0	100.0	100.0	100.0
N	631	297	23	406

Source: (a) Lembaga Demografi, FE-UI, 1974.
(b) Dela et al., 1982.
(c) Suryadhi et al., 1980.
(d) IFPNP survey, 1985.
Note : (*) Vasectomy is included here.

Ag IUD conducted in Bali in 1982-1984 (Prihartono et al., 1984: 7) found that the continuation rate of the IUD was 85.5 per cent in the sixth month and 79.7 per cent in the 12th month of the study. Among the major side effects investigated were infections of the uro-genital systems, bleeding, and spontaneous expulsion. Other reasons such as the health problems, and the desire for more children were used to intentionally withdraw the IUD.

6.2.3. The role of the *banjar* system

The transfer of the government to a New Order Government under Soeharto on the 11th of March 1966 signalled a great shift in the seriousness of the Indonesian government in coping with population problems. Evidence of this was the participation of President Soeharto in signing the United Nations Declaration on Population together with 29 other world leaders in 1967. In 1969, a National Family Planning Institution (LKBN, abbreviated from *Lembaga Keluarga Berencana Nasional*) was established which gradually took over the role of the Indonesian Planned Parenthood Association (PKBI: *Persatuan Keluarga Berencana Indonesia*) founded in 1957. The commitment of the government to supporting the family planning program was realized with the transformation of the LKBN into the Family Planning Co-ordinating Board (FPCB or BKKBN: *Badan Koordinasi Keluarga Berencana Nasional*) in 1970.

The Family Planning Programme, officially launched in 1970 was started in the provinces of Java and Bali. In the first year of the second Five-year Development Plan in 1974 the National Family Planning Programme was extended to some provinces outside Java-Bali (Table 6-2). At the same time in Bali the provincial FPCB started to conduct a feasibility study on the use of the community organization *banjar* system for dissemination of the family planning program (BKKBN Bali, 1979).

When the study was completed in 1976, it was concluded that the *banjar* system had great potential, and since then the family planning program has been carried out through this system. This was legalized by the Governor's instruction No. 002/Ins/2/76, 8 November 1976 (See Appendix VI.1), which mainly announced government support for using the *banjar* system to carry out the family planning program in order to disseminate it more evenly, as the means of a faster internalization of the program in the community.

The head of the *banjar* who is called *Kelian* has a very important role at the grass-roots level of the community. Depending on the main job, there are two kinds of *Kelian banjar*: the *Kelian adat* whose main responsibility is to govern the local community's activities related to traditions and customs; and the *Kelian dinas* whose main responsibility is to be the mediator between the local community and higher levels of

Table 6-2. The extension of Family Planning Programme by areas and starting year.

Region	Province	Starting year of program
Java-Bali:	1. D.K.I. Jakarta	
	2. West Java	
	3. Central Java	1969/1970
	4. D.I. Yogyakarta	
	5. East Java	
	6. Bali	
Java-Bali-I outer islands:		
	7. D.I. Aceh	
	8. North Sumatera	
	9. West Sumatera	
	10. South Sumatera	
	11. Lampung	1973/1974
	12. West Nusa Tenggara	
	13. West Kalimantan	
	14. South Kalimantan	
	15. North Sulawesi	
	16. South Sulawesi	
Java-Bali-II outer islands:		
	17. Riau	
	18. Jambi	
	19. Bengkulu	
	20. East Nusa Tenggara	
	21. East Timor	1978/1979
	22. Central Kalimantan	
	23. East Kalimantan	
	24. Central Sulawesi	
	25. Southeast Sulawesi	
	26. Maluku	
	27. Irian Jaya	

Source: Family Planning Co-ordinating Board, 1985.

government administration[1]. In terms of coverage *Desa Adat*(the community organization at the village level) can be even more powerful than *Banjar Adat* (the community organization at the *banjar* or hamlet level) because the functions of the three main village temples *Pura Puseh* for the God Brahma, the Creator, *Pura Penatran* for the God Wisnu, the Establisher, and *Pura Dalem* for the God Siwa, the Neutralizer, are under the control of *Desa Adat.* One of the most painful punishments that can be imposed on a member of *Desa Adat* is to be expelled from the membership with the consequence of losing the right to any facilities including the three main temples. A member of *banjar* in a village of Gianyar region, for example, recently brought this problem to the court before getting back the right to use the cemetery for a funeral or cremation ceremony because one of the family members had died. But although the family got their rights back, all members of the family are usually still isolated from any major events or activities in the community.

New issues are brought by the *Kelian* into the *banjar* or *desa* meeting which is called *sangkepan* or *paruman*, and is usually held regularly on certain days following the Balinese calendar, for example, on the full moon or new moon days; it takes place at the community hall called *bale banjar* or *bale desa.* When the meeting is about to start, a wooden drum called *kulkul* is hit with a certain rhythm specific for calling the meeting[2]. Before the meeting starts a small offering is made to get protection from the God so that the meeting can be held with no harm and all members will respect whatever decision is made. Therefore, any matter decided in the meeting has the strength of rules and regulations which are usually unwritten. Violation of the decision is subject to punishment which is also decided in a meeting. The feasibility study on the use of the *banjar* system to carry out the family planning program found that 85 per cent of *banjars* impose a cash fine on members who fail to attend *sangkepan banjar* without a good

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[1]*Kelian* can also simply indicate a Chief; this term is used to refer to the chief of a smaller community organization called *Sekeha* or Club. So one can be the Chief or *Kelian* of: *Sekeha manyi* for the rice harvesting club, *Sekeha gamelan* for the music club, *Sekeha ngigel* for the dance club, *Sekeha semal* for the squirrel hunting club.

[2]The rhythm of the drum gives information to the community on what exactly is happening. In case of terrible events such as bloody fighting, house burning, stealing, *amok*, etc., the drum will be hit continually and frequently which is called *bulus*, until all households know and react accordingly. The rhythm is also specific for a new marriage, harvesting, death, etc. In order that the sound of the drum can be heard as far as possible, it is hung in a special high hall called *bale kulkul* which is roofed but open at all sides.

reason. The majority of *banjars* double the fine if the absence occurs more than once (Table 6-3).

Table 6-3. Types of punishment (%) imposed on *banjar* members for failure to attend *banjar* meeting, by frequency of absence.

Type of punishment		Frequency of absence			
		1	2	3	4
Nothing		13.1	7.2	7.2	5.9
Cash fine		85.0	54.4	26.9	17.2
Goods fine		1.6	1.2	3.4	3.1
Administration		-	0.6	1.9	4.1
Compulsory work		-	0.3	0.9	1.6
Doubled cash		-	32.8	47.2	26.9
Temporary expelling		-	-	6.2	20.3
Other		0.3	1.9	1.6	4.4
No answer		-	1.6	4.7	16.6
Total	%	100.0	100.0	100.0	100.0
	N	320	320	320	320

Source: Affandi, 1984.

The same thing was done when it was decided to carry out the family planning program through the *banjar* system. The *Kelian* is given responsibility to conduct a regular monthly meeting among *banjar* members. The main thing a *Kelian* should do at the meeting is to make corrections to the previous registration including births, deaths, and

population mobility. The new report is submitted to the Family Planning Fieldworker Supervisor who will pass it to the Family Planning Clinics. The family planning fieldworker supervisor helps the *Kelian* provide sufficient contraceptives, make the map of users' or eligible couples' residences in the early stage of the program, find new acceptors, supervise acceptors, fill in the registration book, and send three-monthly reports (BKKBN Bali, 1979).

The use of the *banjar* system in disseminating the family planning program has several advantages which include establishing the sense of personal involvement of the community in the program, greater efficiency because the cadres for the field-workers are recruited from the local community, more responsibility for the community in conducting the program because the *banjar's* rules and regulations are applied to the program, and more importantly the transfer of knowledge on family planning straight to the grass-roots level of the community. Consequently, the family planning program is rich with manpower at the community level, which has great potential for any program extension. This system made it possible to carry out the integrated family planning and nutrition program started in 1980. The family planning fieldworkers who usually conducted house-to-house visits bringing messages about the family planning program would also subsequently work in nutrition improvement.

6.3. Multiple regression analysis

Using the single dependent variable of children's nutritional status as the outcome (see Chapter 4), multiple regression analysis shows that some independent variables relating to knowledge and practice of family planning in the 1985 IFPNP survey, but none from the 1980 IFPNP survey, were significantly correlated to children's nutritional status (see Table 6-4). All independent variables: knowledge of Norplant (Kosc), knowledge of the source of services (Source), ever-users of traditional methods (Eutra), ever-users of IUD (Eui), ever-users of condom (Euc), ever-users of menstrual regulation (Eumr), and currently using contraception (Curus) were dichotomously categorized into 1 for *no* and 2 for *yes*.

For the youngest children in the 1985 IFPNP survey, ever-users of traditional methods showed a high coefficient and were also highly significantly correlated, while the current-

users were significantly correlated but with a lower coefficient. The roles of the combined methods explained only 2.5 per cent of the variation in children's nutritional status, but were highly significant. In older children the knowledge of Norplant and ever-users of menstrual regulation showed a high coefficient and the combined variables explained seven per cent in relation to children's nutritional status. More detailed interpretation of each individual variable in relation to children's nutritional status is described in the following sections.

Table 6-4. Staistical values by list of independent variables, 1985 IFPNP survey.

Variables	Coefficient	T-significance
The youngest children		
Eutra	.551	.012
Eui	.235	.032
Euc	.309	.056
Curus	.041	.007
R^2 : 0.025		
Significance : 0.0006		
Older children		
Kosc	.882	.086
Source	.124	.069
Eumr	.715	.033
Curus	.337	.016
R^2 : 0.070		
Significance : 0.003		

6.4. Knowledge of family planning

In the early years of the establishment of the family planning program, the most common survey questions were those related to the knowledge, attitude and practice (KAP) of family planning activities. In the 1973 Fertility and Mortality Survey conducted in Bali (LD-FEUI, 1974), for example, information was collected on the basis of responses on the acceptance of family planning, the knowledge of certain contraceptive methods, and the ever-use and current-use of contraceptive methods. In the later surveys, however, questions were more concentrated on the practice of contraceptive methods than on attitude and knowledge. The IFPNP surveys collected information about the knowledge, in addition to the practice, of family planning only in 1985.

6.4.1. Prevalence of knowledge of family planning

In the 1985 IFPNP survey, knowledge of family planning was obtained from the questions: whether a respondent had ever heard about family planning; and whether she knew certain contraceptive methods. In this survey 10 per cent of women had never heard about family planning. In the Household Profile Survey (HPS) conducted in the same year, using the population of women without children and with children aged under five years, the prevalence was 9.2 per cent (Wirawan, 1986). The prevalence of knowledge of specific contraceptive methods, except of the IUD and Pill, has increased dramatically since the 1973 FMS. The HPS, however, found the prevalences consistently higher than the 1985 IFPNP survey for all contraceptive methods (see Table 6-5), which was probably caused by the difference in populations used in the surveys.

6.4.2. Knowledge of family planning affecting children's nutritional status

The knowledge of family planning can be viewed as an early step towards practising contraceptive methods. In reality it may even mean the possibility that certain simple contraceptive methods have been practised such as abstinence, the calendar system, or the use of herbs. In these cases, better knowledge of family planning can initiate decline in fertility and therefore improvement in children's nutritional status can be expected.

In the 1985 IFPNP survey, the prevalence of malnutrition in the youngest children was lower from mothers with better knowledge of IUD, Pill, vaginal tablet, injection,

Table 6-5. Prevalence (%) of the knowledge of specific contraceptive methods, by methods and source of data.

Methods	Source of data		
	FMS*) 1973	HPS**) 1985	IFPNP 1985
IUD	80.4	86.5	81.8
Pill	64.9	76.4	65.5
Condom	18.4	50.3	48.0
Tubectomy	17.5	62.0	44.0
Vasectomy	6.1	39.7	32.3
Vaginal tb.	2.3	11.5	7.3
Dpv1	NA	62.8	50.3
MR2	NA	52.2	34.5
Traditional3	NA	43.8	26.9

Source: *) LD-FEUI, 1974.
**) Wirawan, 1986.
Note :1 Depo provera (injection)
2 Menstrual regulation
3 Traditional methods

vasectomy, and menstrual regulation, but higher from mothers who had ever heard of family planning and with better knowledge of condom, Norplant, and traditional method. The prevalence of malnutrition in older children was lower from mothers with better knowledge of Pill and injection, and those who had ever heard of family planning, but higher from mothers with better knowledge of other methods (Table 6-6).

Table 6-6. Prevalence (%) of malnutrition in children by knowledge in family planning, IFPNP 1985. (WFH)

Contraceptive method	Prevalence (%) of malnutrition in children							
	Youngest				Older			
	With knowl.		Without knowl.		With knowl.		Without knowl.	
	%	N	%	N	%	N	%	N
Ever heard f.p.	26.5	657	25.0	92	25.3	257	26.3	38
IUD	25.4	607	30.3	142	27.4	237	17.2	58
Pill	26.1	486	26.6	263	24.6	183	26.8	112
Condom	28.7	349	24.3	400	28.0	132	23.3	163
Vaginal tablet	22.4	49	26.6	700	38.9	18	28.7	277
Injection (DP)	26.1	376	26.5	373	24.7	150	26.2	145
Norplant	30.3	33	26.1	716	46.2	13	24.6	282
Tubectomy	26.3	335	26.3	414	27.9	136	23.3	159
Vasectomy	24.4	246	27.2	503	29.5	95	23.5	200
MR 1	23.6	250	27.7	499	27.6	98	24.4	197
Traditional	27.0	204	26.1	545	28.6	77	24.3	218

Note:
1 Menstrual regulation

So 36.4 per cent out of 11 types of knowledge in family planning asked in the 1985 IFPNP survey showed higher prevalence of malnutrition in the youngest children from mothers with better knowledge in family planning, and 72.7 per cent showed higher

prevalence of malnutrition in older children from mothers with better knowledge in family planning. This finding, therefore, explains that women with better knowledge in family planning covered in the 1985 IFPNP survey did not necessarily have children with better nutritional status. Sometimes there is a rumour in the community that a woman does not even know that an IUD has been inserted in her uterus. If this is the case, the woman does not necessarily have knowledge of family planning, but she is prevented from having more children by the unintentional use of one of the most effective methods consequently resulting in better nutritional status of her children.

Multiregression analysis - using continuous interval weight for height SD-score (cut-off point -1 SD) as dependent variable of children's nutritional status and mothers' knowledge in contraceptions as independent variables - found that lower prevalence of malnutrition in children was correlated to mothers' better knowledge on IUDs ($P<0.08$) and on pill ($P<0.09$) for the youngest children, and on Norplant ($P<0.08$) for older children, in the 1985 IFPNP survey.

6.4.3. Prevalence of ever-users of contraception

The prevalence of ever users of any contraceptive methods from the IFPNP surveys increased from 56.5 per cent in 1980 to 66.1 per cent in 1985. Together with certain contraceptive methods including IUD, tubectomy, and injection, the prevalence of ever users increased highly significantly from the 1980 to 1985 IFPNP surveys (Table 6-7, 6-8, and 6-9). Other contraceptive methods than those mentioned above did not show a meaningful change during the five-year period, but since the IUD is the most popular contraceptive method, in terms of the role in declining fertility for the time being other methods can actually be ignored.

There were 33.9 per cent of women who had never used any contraceptive methods in the 1985 IFPNP survey. The reasons for never using any methods, ranked from the largest proportion, are as follows: wants more children, fears of unexpected effects, lack of knowledge of proper methods, husband disagrees with using contraception, lacks knowledge of service accessibility, family member disagrees on using contraception, and other (Table 6-10). The result from the Household Profile Survey is presented in the same table for comparison.

Table 6-7. Prevalence (%) of ever-users of contraceptive methods, by methods, 1980 and 1985 IFPNP surveys.

Contraceptive method	Prevalence (%) of ever-users	
	1980 (N=1210)	1985 (N=835)
IUD	34.5	47.7
Pill	12.0	11.0
Condom	NA	6.3
Vaginal tablet	0.3	0.2
Injection(DP)	0.5	6.5
Implantation	NA	0.1
Tubectomy	0.4	3.1
Vasectomy	NA	0.4
MR	NA	0.8
Traditional	NA	3.6
All methods	56.5	66.1

NA: Not available

The high proportion of women giving reasons for never-use apart from 'wants more children' is probably associated with the source of family planning services, all of which seem to be improvable. This is based on the experience of ever-user women when they were asked the place where they last got service. The majority of them (74.7 %) got it at

Table 6-8. Prevalence (%) of ever-users by age of women, 1980 and 1985 IFPNP surveys.

Age group (yrs)	Prevalence (%) of ever-users					
	1980			1985		
	Yes	No	N	Yes	No	N
15-19	28.4	71.6	70	41.9	58.1	31
20-24	47.6	52.4	420	61.7	38.3	297
25-29	63.5	36.5	316	70.8	29.2	257
30-34	67.4	32.6	180	67.6	32.4	145
35-39	75.0	30.7	104	69.3	30.7	75
40-44	70.0	30.0	40	80.0	20.0	25
45-49	80.0	20.0	5	66.7	33.3	3
Total	56.5	43.5	1135	66.1	33.9	833

Table 6-9. Significant level of the difference of ever-users' prevalence between 1980 and 1985, IFPNP, by methods. (df=1)

Contraceptive methods	Significant level P
All methods	<0.01
IUD	<0.01
Pill	NS
Injection	<0.01
Tubectomy	<0.01

NS: not significant

Table 6-10. Reasons (%) for never using contraceptive methods.

Reasons	IFPNP, 1985 N=289	HPSa) N=284
Wants more children	54.2	50.7
Fears	15.5	18.3
No proper methods	4.2	3.9b)
Husband disagrees	3.2	3.9c)
Service inaccessibility	2.8	-
Family member disagrees	0.4	-
Other	19.7	23.2
Total	100.0	100.0

a) Source: Wirawan, 1986.
b) Service inaccessibility included.
c) Family member disagrees included.

either family planning clinics, hospitals, community health centres, or mother and child health clinics. The source of service which has potential to attract the new acceptors - in this case those who never used - such as the visit of the family planning field workers and safari team, in fact, played the least (2.4%) important role as the source of services. Even the Community Hall or the *Kelian's* house which were supposed to have important roles, in fact, were only used as the source of services in 3.7 per cent of cases. It is very likely that never-users can be encouraged to practise family planning if sources at the community level can be more active.

6.4.4. Ever-users' influences on children's nutritional status

The prevalence of malnutrition among children of ever-user mothers (excluding current-users) was lower than among those of never-users. This is found in both the 1980 and 1985 IFPNP surveys for the youngest children, and in the 1980 IFPNP survey for older children. However, the prevalence of malnutrition among children of ever-user mothers (excluding current-users) was higher than among those of never-users for older children of the 1985 IFPNP survey (Table 6-11). The prevalence of malnourished youngest children in the 1985 IFPNP survey whose mothers were ever-users is significantly ($P<0.01$) lower than those of never-users.

Multiregression analysis found that lower prevalence of malnutrition in children was correlated to ever-users of the IUDs ($P<0.02$), condom ($P<0.03$), and traditional methods ($P<0.03$) for the youngest children, and to ever-users of menstrual regulation for older children, in the 1985 IFPNP survey.

6.5. Current users of contraception

6.5.1. Phases of achievement

The FPCB classifies the regions on the basis of the achievement of the prevalence of current users of program contraceptives into phases: Phase I for 0-14.9 per cent achievement, phase II for 15-34.9 per cent achievement, phase III for 35-54.9 per cent achievement, and phase IV for 55 per cent and over achievement. Using this classification all provinces, except East Timor, were at the levels of phase II and over in 1985. This is a tremendous achievement, when 12 provinces in 1980, decreasing to three provinces in 1984, were still at the level of phase I (BKKBN, 1985; Streatfield and Larson, 1987). By 1985 three provinces, North Sulawesi, Bali, and D.I. Yogyakarta were already in phase IV; nine provinces were in phase III; 14 provinces were in phase II; and only one province, East Timor, was still in phase I (Table 6-12).

The levels of contraceptive prevalence achievement seem to correlate with the proportion between the number of the service sources and the total number of married women. In 1985 the proportion was 9-11 per cent in the phase IV provinces, 6-9 per cent in the phase III provinces, 3-5 per cent in the phase II province, and one per cent in the

Table 6-11. Prevalence (%) of malnutrition in children by birth-order, contraceptive-users, 1980 and 1985 IFPNP surveys. (WFH)

Ever-users	Prevalence (%) of malnutrition in children			
	Youngest		Older	
	%	N	%	N
		1980		
Yes	34.6	335	32.7	171
Never	39.7	428	33.7	196
Total	37.5	763	33.2	367
		1985		
Yes	23.6	89	24.2	33
Never	29.4	180	21.9	73
Total	27.5	269	22.6	106

phase I province (SUPAS, 1985; Streatfield and Larson, 1987). This fact agrees with one of Hull's (1978) views on the causes of the high performance level of Balinese women practising family planning. The prevalence of current-users of the IFPNP surveys, however, falls into phase I in 1980 and phase III in 1985

The sources mostly used by the women in obtaining family planning services in the 1985 IFPNP survey were family planning clinics, hospital, health centre, and mother and

Table 6-12. Province classification by contraceptive prevalence achievement levels and province, Indonesia, 1985.

Prevalence levels (%)	Provinces
0-14.9 (phase I)	East Timor
15-34.9 (phase II)	D.I. Aceh
	North Sumatera
	West Sumatera
	Riau
	South Sumatera
	West Nusa Tenggara
	East Nusa Tenggara
	West Kalimantan
	Central Kalimantan
	Central Sulawesi
	South Sulawesi
	Southeast Sulawesi
	Maluku
	Irian Jaya
35-54.9 (phase III)	Jambi
	Bengkulu
	Lampung
	D.K.I. Jakarta
	West Java
	Central Java
	East Java
	South Kalimantan
	East Kalimantan
55+ (phase IV)	North Sulawesi
	Bali
	D.I. Yogyakarta

Source: Streatfield and Larson, 1987.

child health centre, which represent 74.7 per cent. The private practice of midwives and doctors represents only the second highest, 12.6 per cent; and the remaining sources are family planning post or *Kelian's* house, family planning safari team, community hall, family planning field workers, etc.

6.5.2. Prevalence of current-users

The IFPNP surveys show a highly significant increase in the prevalence of current-users from 1980 to 1985, which has changed the prevalence of current-users' achievement from phase I in 1980 to phase III in 1985, according to the FPCB classification. The increase in current-users is exhibited in all five-year age groups of women, except in the age group of 45-49 years, which was probably caused not only by the small number of women in the age group but also by the likelihood that they were in the early stage of menopause.

The peak prevalence of current-users in the 20-24 years age group among women under 40 years of age in the 1985 IFPNP survey is particularly important because using contraceptive methods in this young age group will not only prevent them from having frequent births with close intervals but also give them more opportunity to recover from the previous births and to be in a state of good health thereafter. Consequently, more care can be given to their children from early in their life, resulting in better nutritional status and health so the children can survive healthier and longer.

The use of IUDs as the method of choice for Balinese women exhibits the highest increase from 1980 to 1985 of the IFPNP surveys (Table 6-13). The use of other methods which increased significantly includes Pill, injection of Depo Provera, and tubectomy. In the 1985 Intercensal Population Survey, the prevalence of women currently using contraceptive methods was as follows: IUDs 70 per cent, Pill 9 per cent, tubectomy 8.6 per cent, injection 3.9 per cent, and others 8.5 per cent (CBS, 1985).

The low percentage of women currently using contraceptive methods in the 1980 IFPNP survey may be affected by the population used in the survey, i.e. the households of pregnant women and lactating mothers. Besides, some methods collected in the 1985 IFPNP survey included the traditional methods, Norplant, and menstrual regulation were not covered in the 1980 IFPNP survey. The methods usually used by husbands such as vasectomy and condom were not separately classified in the 1980 IFPNP survey.

Table 6-13. Prevalence (%) of current users by age of women, 1980 and 1985 IFPNP surveys.

Age group (yrs)	Current users					
	1980			1985		
	Yes	No	N	Yes	No	N
15-19	3.2	96.8	70	38.7	61.3	31
20-24	2.0	98.0	420	51.9	48.1	297
25-29	0.9	99.1	316	49.0	51.0	257
30-34	2.8	97.2	180	46.2	53.8	145
35-39	2.9	97.1	104	44.0	56.0	75
40-44	0.0	100.0	40	60.0	40.0	25
45-49	0.0	100.0	5	0.0	100.0	3
Total	1.9	98.1	1135	48.8	51.2	833

Table 6-14. The significant levels of the difference in current-users between 1980 and 1985 IFPNP surveys, by methods. (df=1)

Contraceptive methods	Significant level (P)
All methods	<0.001
IUD	<0.001
Pill	<0.01
Injection	<0.01
Tubectomy	<0.01

6.5.3. Current-users and the number of children ever born

The fertility level indicated by the average number of children ever born in the IFPNP surveys was 2.9 in 1980 and 2.7 in 1985 as shown in Chapter 5. The average number of children ever born of the 1.9 per cent of current-users in 1980 was 2.8 compared to 3.0 of those who currently did not use contraceptive methods. The lower average number of children ever born among current-user women was proved to be significant ($P<0.05$). The difference in the average number of children ever born in the 1985 IFPNP survey between the current-users whose average ever born was 2.6 and those women who were not current-users whose average ever born was 2.9 was even significantly higher ($P<0.01$).

6.5.4. Current users' influences on children's nutritional status

The current-users, excluding those women who ever used any methods, exhibit a better nutritional status among their children in both 1980 and 1985 IFPNP surveys (Table 6-15). In the 1980 IFPNP survey the small proportion of current-user mothers did not affect too much the total prevalence of malnutrition among children of current-user mothers and never-user mothers. The prevalence of lower malnutrition among children whose mothers were current-users in the youngest children in 1985 is consistent with the peak prevalence of current-users in the 20-24 years age group.

Multiple regression analysis found that lower prevalence of malnutrition in children was correlated to mothers currently using contraception. The correlation was highly significant for the youngest children ($P<0.01$) and significant ($P<0.02$) for older children.

Table 6-15. Prevalence (%) of malnutrition in children by users of contraception, IFPNP 1980 and 1985 surveys.
(WFH)

Users	Prevalence (%) of malnutrition in children			
	Youngest		Older	
	%	N	%	N
	1980			
Current	20.0	15	25.0	8
Never	39.7	428	33.7	196
Total	39.1	443	33.3	204
	1985			
Current	27.4	274	22.8	92
Never	29.4	180	22.9	74
Total	28.2	454	22.9	166

6.6. Conclusion

The achievement of high prevalence of contraceptive use in Bali is supported by various aspects such as the religiously and traditionally supported preference for having a smaller number of better-quality children, less objection to insertion of the IUDs by either male or female health personnel, the successful use of the community organization, the *banjar* system, to disseminate the family planning program at the grass-roots level, and the large networks of service sources. However, fears and inaccessibility of services were given by the women as the main reasons for never using contraception; this last aspect needs improvement in order to maintain a high level of contraceptive use.

The use of IUDs as the method of choice of Balinese women is a particularly important contributor to the decline of fertility which occurred from 1980 to 1985. The use of other methods, especially the pill, injection, and tubectomy, is also tending to increase, which undoubtedly will decrease fertility further. The use of all these methods was proved to significantly increase from 1980 to 1985 in the IFPNP surveys. The role of contraception in declining fertility was also proved from the difference in the average number of children ever born between women who were current-users and those who were not, in both the 1980 and 1985 IFPNP surveys.

The acceptance of family planning leads to the improvement in children's nutritional status. The significant improvement in children's nutritional status from 1980 to 1985 (see Chapter 4) is consistent with the significant increase in contraceptive use discussed in this chapter. In general, women with better knowledge, ever use or current use of contraceptive methods had a lower prevalence of malnourished children. The women who had ever used contraception were proved to have a significantly lower prevalence of malnourished children particularly in the youngest children in the 1985 IFPNP survey.

It is apparent that the Integrated Family Planning and Nutrition Programme in Bali has been successful in increasing the prevalence of contraceptive use, resulting in the decline in fertility and some improvement in children's nutritional status.

Multiple regression analysis shows that some knowledge and practice of mothers in family planning were highly correlated to children's nutritional status. Variables of contraception significantly correlated positively to children's nutritional status included

the knowledge in contraception of IUDs and pill for the youngest children, and of Norplant for older children; ever-users of IUDs, pill, and condom for the youngest children, and of menstrual regulation for older children; and of the current-users for both the youngest and older children.

Chapter 7

Influences of socio-cultural factors on children's nutritional status

7.1. Introduction

In Bali the majority of the population are practising Hindus and the dynamic balance of life is kept by the practice of the people to worship God and their ancestors, respect each other and be aware of the need to treat the nature surrounding them as the creation of Almighty God. In the course of time this has made Bali culturally unique. The island is beautifully decorated both by nature and by the highly developed skill of the people in art, craft, dance, music and various enjoyable offerings and ceremonies. Hence, foreigners have described the beauty of the island variously as the island of gods, paradise island, or the morning sunshine in the east.

Although the proportion of population practising Hinduism is decreasing, it is still the religion of the majority of the population (Table 7-1).

Thus, the 'world' of children in Bali is characterized by the way of life of the Hindu community. The health condition of a child is connected to various things such as the reincarnated ancestors, the four brothers *kanda empat* who accompanied him when he was born, the completeness of human-being ceremonies *manusa yadnya* conducted for him, the completeness of ceremonies conducted for the houseyard, the black magic or evil spirits. A child is treated in a special manner and is called *ratu*, god, until the eruption of the first permanent tooth, no matter what caste he belongs to. At the moment of birth he is addressed with high-sounding honorific phrases reserved for gods or the souls of ancestors (Mead, 1970: 199).

In the course of development, changes, particularly the improvement of mothers' education, may have brought other socioeconomic and cultural aspects into the traditional way of life in improving the nutritional status of children. The role of mothers' education

Table 7-1. Percentage of Bali population, by year and religion.

Religion	Year				
	1920 (a)	1930 (a)	1971 (b)	1980 (c)	1985 (d)
Hindu	97.8	97.3	93.3	93.3	93.1
Islam	1.4	1.6	5.1	5.2	5.4
Others	0.8	1.1	1.6	1.5	1.5

Source:
a) Dutch Scholars, 1960.
b) CBS, 1971.
c) CBS, 1980.
d) CBS, 1985.

in improving health conditions of children was described by Caldwell (1978) as working through several factors: mothers and other persons involved break with tradition or become less fatalistic about illness and adopt any of the alternatives in child care and the cure of illness; educated mothers are more capable of manipulating the modern world; education of women changes the traditional balance of familial relationship with profound effects on child care.

This chapter examines the effects of some sociocultural aspects such as the use of traditional healers, mothers' education, housing condition, and mothers' occupation on children's nutritional status.

7.2. Religion and ritual

Hindu Dharma is the religion practised by more than 93 per cent of the population in Bali. The people base their way of life on the Five Principles of *Panca Srada*, which comprise: first, *Brahman*, the belief in the existence of the Supreme God; secondly, *Atman*, the belief in souls and spirits; thirdly, *Samsara*, the belief in reincarnation; fourthly, *Karma*, the belief in the reward for good deeds or penalty for bad deeds; and fifthly, *Moksha*, the belief in the possibility of a unity with the divine.

On the basis of these five principles, it is believed that life follows a time-series circle: a person will experience multiple life and death cycles, unless he behaves perfectly in thinking, speaking and doing which is called *trikaya parisuda* for which he is able to *moksha* and then unifies in God. Otherwise he will reincarnate again and again with better or worse manifestation, depending upon his experiences during his life. As Mead (1970) described it:

> The whole of life is seen as a circular stage on which human beings, born small, as they grow taller, heavier, and more skilled, play predetermined roles, unchanging in their main outlines, endlessly various and subject to improvisation in detail. The world of death is one part of the circle, from which human souls return, born again, and so on.

Because of the possibility of multiple life and death cycles, it is believed that only a son is able to free his parents from hell to heaven after or during the death cycle period. So Balinese consider it extremely important to have *putra sasana*, the son, who has the duty to care for his ancestors. It is possible, however, to identify a girl as a son by allowing her after marriage to stay at home and be responsible for carrying on the duty of a son, a special marriage arrangement called *nyentana*. In case of infertility the family adopts a child from the closest family and if all fails the wife allows her husband to marry a second wife. This system of solving the problem of sex of children has probably influenced married couples to avoid divorce and made acceptance of a small family norm easier.

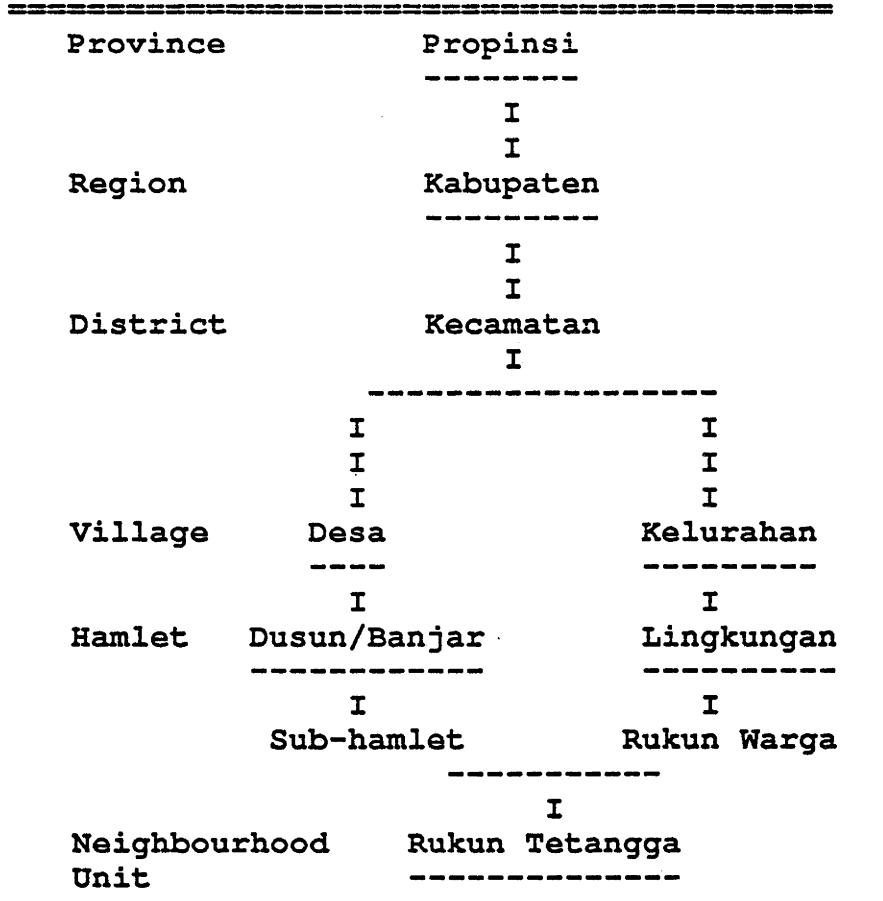
The Balinese ritual *upakara* is divided into five holy duties called *Panca Yadnya*, as follows: 1. *Dewa Yadnya*, the ceremonies and festivals to glorify God and all of the manifestations; 2. *Pitra Yadnya*, the rites of death; 3. *Rsi Yadnya*, ceremonies on behalf of the Hindu prophets; 4. *Manusa Yadnya*, ceremonies for human beings; and 5. *Bhuta Yadnya*, sacrifices for the occupants of the underworld in order to neutralize their influence.

So in every space and time Balinese will think of three things, the *Tri Hita Karana*, as follows: First, there is *parahyangan* symbolized by temples; secondly, *pawongan*, mankind; and thirdly, *palemahan*, the environment with all it contains. These three parts are used to indicate the *Desa Adat* or traditional village in Bali. The *Parahyangan* comprises three temples called *Kahyangan Tiga*: *Pura Puseh*, for worshipping the God Brahma; *Pura Penataran*, for worshipping God Wishnu; and *Pura Dalem*, for worshipping God Shiwa. The proverb *desa mawa cara* (the village carries custom) indicates the retention of a substantial degree of autonomy by the village under the Balinese Kingdom. The *desa* numbering around 500 all over Bali are organized from around 3500 *banjar*. The *banjar* is a ritual and social community ordinarily comprising an average of around 75 households. Under the 1979 Village Government Law (Warren, 1986) the government reorganized the administrative structure of the villages as shown in Figure 7-1.

Ceremonies for human beings start as soon as conception takes place. Ceremonies during the gestational period include *megedong-gedongan* for the welfare of the foetus. During the first trimester of pregnancy a ceremony can be performed to request the gender of the child. After birth the placenta is buried at the front door of the houseyard, at the right side for males and the left side for females. The placenta is treated in religion similarly to the newborn until about three and a half months. This is done because it is believed that the four brothers *Anggapati*, *Mrajapati*, *Banaspati*, and *Banaspatiraja* stay in the placenta and have responsibility for the health of the baby if they are respected or the sickness of the baby if they are ignored. The birthday is another *manusa yadnya* which is celebrated for the first time at the age of about seven months and continued regularly every seven months thereafter.

Except for the birthday Balinese usually conduct the *Panca Yadnya* based on the Balinese horoscope *palelintangan*, which is composed of three calendars, the *wariga surya*, solar calendar, the *wariga candra*, lunar calendar, and the Javano-Balinese weekly calendar, called *pawukon*. A month consists of 30 days beginning from the waxing moon, *tanggal*, to be followed by the waning moon, *panglong* and ends at the dark moonlight *tilem* with the full moon night in between the waxing moon and the waning moon. This is quite different from the Western Gregorian calendar where New Year's Eve is celebrated at the first minute of the first month. The Balinese end their year on the equinox, as the sun crosses the equator on its way northwards.

Figure 7-1. Provincial government hierarchy.



Source: Warren, 1986.

7.3. The traditional healers

The traditional healers in Bali are commonly called *balian*. In some communities *balian* also function as priests who conduct ceremonies in the temples but as healers when they function as *Jero Dasaran* to consult with the gods and the ancestors by trance to cure illnesses.There are many kinds of *balian* (see Chapter 2), but two of them, *balian manak* (the traditional birth attendants) and the *balian usada* (the traditional healers) have closer relation to the health conditions of children.

7.3.1. Traditional birth attendance

The traditional birth attendance in Bali is unique in terms of the majority of males over females. There are several possible reasons for this such as that physically males are stronger than females, and the husband (male) is usually the closest attendant who can help in delivering their baby if the wife suddenly gives birth. Possibly the strongest reason, however, is based on the common belief that an older woman (the age of the traditional birth attendant) is likely to be a witch popularly called *leyak* who under the control of the black-magical power is believed to be able to transform herself into an ugly woman or various creatures such as a pig or monkey, and by doing so she must kill persons, preferably children or weak people, to be offered to the goddess of death, Durga.

This belief is based on a famous story of the witch *rangda*, the widow, called Calonarang who lived in the village of Girah (or Jirah or Dirah) of the Kingdom of Daha Pejarakan in East Java, during King Erlangga's reign from 1019 to 1042 AD (Toer, 1957:3). People in the Kingdom lived in prosperity, happiness, and peace, until one day bad news was suddenly received by the King about the outbreak of a fatal disease which had already killed many people in the peripheral areas. The investigators sent to the areas confirmed that the witch had created the disaster, simply because nobody wanted to marry her beautiful daughter, Ratna Manggali. Instead, all people kept away for fear of her mother's evil reputation.

King Erlangga sent his soldiers to kill Calonarang. They arrived in the village at night and silently approached Calonarang's bedroom while she still slept. After they succeeded in entering, one of the soldiers held Calonarang by the hair and the others were ready to cut off her head. However, all the soldiers in the room were suddenly unable to move and at the same time fires came out from Calonarang's body and burnt the soldiers to death. Calonarang continued attacking and killing other soldiers until almost all of them were dead; the rest who escaped from the fatal attack of Calonarang returned to report to the King their defeat in the battle.

Then King Erlangga asked for help from a great priest, Mpu Bharadah, in the village of Lemah Tulis to fight against the magical power of Calonarang. Mpu Bharadah sent his younger son Mpu Bahula to marry Ratna Manggali in order to get the secret of Calonarang's magical power. After the marriage, Mpu Bahula persuaded Ratna Manggali

to steal the secret book used by her mother. At a time when Ratna Manggali knew that her mother was not using the book she took it for Mpu Bahula, who hurriedly showed it to his father. Mpu Bharadah was very glad because his plan had worked sucessfully. Mpu Bahula then returned to Girah and handed the book to Ratna Manggali to put it back before her mother returned home. Actually, Calonarang had already discovered that she could no longer keep her power, when while she was praying in the cemetery temple for more power to extend the killing to people in the centre of the Kingdom including King Erlangga, God Durga warned her to be careful and that she was close to the end. Calonarang became even more angry and asked her followers such as Larung, Lendalendi, Weksirsa, and Mahisa Wadana to kill more people.

The next day Mpu Bharadah left for Girah to fight Calonarang. Along the road he met families mourning the deaths of their members. Some of the sick people were successfuly treated. As Mpu Bharadah came closer to Calonarang's residence he met Weksirsa and Mahisa Wedana near a cemetery where they were about to perform the ritual to become *leyak*. They apologized for following the wrong way of life and asked the great priest to cleanse them so they could live normally and could attain heaven when they died. The priest answered that he would do so if they brought him to Calonarang. When the priest met Calonarang he was asked to kindly cleanse her from her bad habits and to forgive her for killing so many people; he refused, so in a rage she tried to kill him. Knowing the secret of Calonarang, the priest calmly let her use all of her power; at last he retaliated and the witch died instantly. This good news was sent to King Erlangga who delightedly promoted Mpu Bharadah to be his religious teacher and priest (Astra and Bawa, 1978).

Balinese perceive the name of Calonarang and Rangda both as the mother of *leyak*. However, *Calonarang* indicates more the performance, whereas *Rangda* is to the mask. The Calonarang story can be performed in the shadow puppet play, in the *barong* dance, or in the *calonarang* itself, which is also known as *keris* dance. The *keris* dancers who are all men probably symbolize the soldiers of King Erlangga who try to attack Calonarang; however, they are defeated by her magical power, so instead of attacking Calonarang they turn the *keris* against themselves in an unconscious state. Surprisingly, after they become conscious, there is nobody wounded. The *keris* dance can be seen in any temple festival, but the *Pengrebongan* at Kesiman, about four kilometres east of the

central city of Denpasar, is one of the most popular temples performing the dance every seven months around the *Galungan* festival.

In the beginning of the performance when the widow *Rangda* has not yet been transformed into the mother of *leyak*, Calonarang, all of the Rangda's pupils are portrayed by girls, which probably has ensured Balinese perception that women are more likely to be *leyak* than men. The Balinese also claim that women have a greater aptitude for becoming *leyak* so they require less study than men (Covarrubias, 1937: 344). Consequently, being afraid of sickness caused by the *leyak*, there is a preference for men rather than women for delivering babies in Bali.

The excess of this perception, however, is not infrequently troublesome especially to older widows. Even nowadays sometimes a widow is found murdered, whose killer says that he killed a tiger, a pig, a monkey, or chicken instead of a person when he did it. In 1979 when health services were conducted for aged people by the Faculty of Medicine of Udayana University at the Social Institution, Tangtu, about four kilometres north of the International Sanur Beach Hotel, a widow told me that she was forced to live in the Institution to prevent her from being killed by the community in her village because she was said to have a special formula for becoming a *leyak*.

7.3.2. *Usada rare*, 'medicine' for infants

One of the *usadas*, the traditional references for healing, is called *usada rare*, 'medicine' for infants. One of the most common methods a traditional healer uses in treating a sick child is to consult the *kanda empat*, the four brothers believed to be present when the child was born. It is believed that ignoring them can cause sickness, but continuously remembering them can keep the child healthy. Besides, the materials used to cut the umbilical cord and the offering for burying the placenta, such as the *engad*, the bamboo-cutter, the *dapdap* tree leaves, the ash, the salt, the turmeric, the coconut oil, the candle-nut, the black palm-fibres, and the coconut shell are also believed to be the accompaniments of the child and can cause miserable diseases if they are ignored.

All of the materials are believed to be able to turn into deities which can cause a specific illness. *I Lisah*, the bamboo-cutter causes panic, insomnia; *I Jajil*, the *dapdap* tree leaves, drowsiness and diarrhoea; *I Garem*, the salt, stomatitis; *Tikmaya*, the candle-nut, oedema;

Sang Kamajaya, the turmeric, causes a disease called *sarab brahma* involving difficulty in defaecation; the coconut oil causes profuse diarrhoea, colic, and fever; *I Buta Breganjong*, the black palm-fibre used to cover the placenta when it is buried, causes whooping cough, convulsions, *trismus* (lockjaw), and *ructus*.

In such cases a traditional healer usually takes several actions to cure the sickness: first, using a holy formula he meditates and 'invites' the *Kanda empat* to enter the child's body and to help cure his sickness, *Anggapati* to the heart through his mouth, *Merajapati* to the lungs through his nose, *Banaspati* to the liver through his eyes, and *Banaspatiraja* to the kidneys through his ears. Second, depending on the sickness the child is given a combination of herbal medicine to drink and a compress on certain parts of the body; and third, offerings are made to the God, ancestors, and the inferior magical 'world' of *buta kala*.

7.3.3. Influence of traditional health services on children's nutritional status

The 1980 Integrated Family Planning and Nutrition Programme (IFPNP) survey collected information on the use of traditional healers by the family of the respondents. The question was specifically directed to the types of health services first used when a family member got sick. The reasons for first using the specific health services were also asked.

Fewer than seven per cent of the respondents' family members used the traditional health services compared to almost 80 per cent using the categorized modern health services, which consisted of doctors, midwives or nurses, hospitals, health centres, and satellite health centres. The rest either stayed home or used other types of health services which were not classified in detail in the questionnaires (Table 7-2). In terms of the reasons, using the traditional healers (excluding the health services grouped into 'other' category) was ranked the fifth in trustworthiness following doctors, hospitals, satellite health centres, and nurses and midwives; the second for cheapness following hospitals; the fourth for accessibility following nurses and midwives, health centres and satellite health centres; and the second for other reasons following staying home.

The relationship between the use of the types of health services and the prevalence of children's malnutrition is shown in Table 7-3. The prevalence of children's malnutrition

Table 7-2. Reason for first using particular health services for medication, by type of health services 1980 IFPNP survey.

Type of health services	Reason (%)				Total	
	Cheap or free	Trust	Close to home	Other	%	N
Staying home	17.2	27.6	27.6	27.6	100.0	29
Tradition.1)	17.3	38.7	32.0	12.0	100.0	75
Nrs & Mw 2)	5.9	42.8	47.4	3.9	100.0	437
Doctor	11.8	67.1	17.1	3.9	100.0	76
Sat. HC 3)	10.9	44.8	41.2	3.0	100.0	165
HC 4)	16.6	37.8	43.0	1.6	100.0	193
Hospital	22.4	56.1	18.7	2.8	100.0	107
Other	10.4	28.6	43.5	17.5	100.0	154
Total %	11.5	42.6	39.8	6.1	100.0	
N	143	526	492	75		1236

Source : Suryadhi et al., 1982: 57.
Notes :
1): Traditional healers
2): Nurses and midwives
3): Satellite Health Centre
4): Health Centre

was lower among those who first visited the traditional healers than among those who first visited the modern type of health services both for the youngest and older children

aged under five years. This is probably the result of several things including a very small number of the community consulting the traditional health services, the use of traditional health services on the basis of other than children's health problems, or the awareness in the community of the need to use modern health services for more severe cases.

Table 7-3. Prevalence (%) of malnutrition in children by types of health services and children's birth-order, 1980 IFPNP survey. (WFH)

Types of health services	Prevalence (%) of malnutrition in children			
	Youngest		Older	
	%	N	%	N
None	36.4	22	33.3	6
Traditional	28.9	45	30.4	23
Modern	38.0	624	33.4	302
Other	34.4	93	29.8	47
Total	37.0	784	32.8	372

Information on the role of traditional birth attendance was collected in both the 1980 and 1985 IFPNP surveys; however, the questions used were different. In the 1980 survey birth attendance was asked for each child of those aged under five years, but in 1985 was asked only for the youngest. So in the 1985 IFPNP survey the birth attendance can only

be related to the nutritional status of the youngest children. The prevalence of children's malnutrition was lower among those delivered by the traditional birth attendants than by doctors and midwives both in 1980 and 1985 (Table 7-4). This finding does not agree with the expectation that modern birth attendants should give better results in delivering babies.

When the types of birth attendants were investigated further it was found that doctors and midwives handled more cases with difficulty in parturition than other types of birth attendants including the traditional ones (Table 7-5). So the lower prevalence of malnutrition among children delivered by the traditional birth attendants is probably because more difficult cases were delivered by doctors and midwives. If this was the case then women with difficulty in parturition should have higher prevalence of children's malnutrition. This information was also collected in the 1985 IFPNP survey, and it was found that the prevalence of children's malnutrition is higher among mothers with difficulty in parturition (Table 7-6).

7.4. Multiple regression analysis

Using the single dependent variable of children's nutritional status as the outcome (see Chapter 4), multiple regression analysis shows that some independent variables among the socio-cultural factors were significantly correlated to children's nutritional status.

Education of mothers (Women educ.) was classified into 1 for no-schooling, 2 for some primary, 3 for completed primary, and 4 for completed junior high and over. The walls were classified according to the quality of materials into three groups 1 for the poorest quality such as of mud, 3 for the highest quality such as of tiles, and 2 for in between. The source of water (Source) in the 1980 IFPNP survey was classified into 1 for open surface water, 2 for wells, and 3 for ground water. Other independent variables were dichotomously classified and coded 1 for the answer *no* and 2 for the answer *yes*.

The list of independent variables is presented in Table 7-7. More detailed interpretation of each single variable in relation to children's nutritional status is described in the following sections.

Table 7-4. Prevalence (%) of malnutrition in children by types of birth attendants, 1980 and 1985 IFPNP surveys.
(WFH)

Types of birth attendants	Prevalence (%) of malnutrition in children			
	Youngest		Older	
	%	N	%	N
1980				
Traditional 1)	28.8	160	27.6	76
Modern 2)	38.4	438	28.9	197
Other	34.6	471	33.6	235
Total	35.3	1069	30.9	508
1985 *)				
Traditional 1)	17.4	115		
Modern 2)	28.1	416		
Other	33.6	113		
Total	26.2	644		

*) Data of the 1985 IFPNP survey involved only the youngest children.
1) Traditional birth attendants.
2) Modern birth attendants (doctors and midwives).

Table 7-5. Difficulty in birth (%) of the youngest children by the types of birth attendants, 1985 IFPNP survey.

Types of birth attendants	Difficulty in birth (%) of the youngest children: Yes	No	Total: %	Total: N
None	0.0	100.0	100.0	14
Family members	2.5	97.5	100.0	122
Traditional	3.6	96.4	100.0	137
Mw & doctors	12.4	87.6	100.0	531
Other	0.0	100.0	100.0	5
Total %	9.1	90.9	100.0	
N	74	735		809

Table 7-6. Prevalence (%) of malnutrition in the youngest children, by difficulty in birth, 1985 IFPNP survey.
(WFH)

Difficulty in birth	Prevalence (%) of malnutrition in the youngest children: %	N
Yes	32.8	58
No	25.6	694
Total	26.2	752

Table 7-7. Statistical values by list of independent variables, 1980 and 1985 IFPNP surveys.

Variables	Coefficient	T-significance
	1980	
Women educ.	.178	.001
Boilwater	.165	.029
Water source	.013	.054
R^2 : 0.0200		
Significance : 0.0002		
	1985	
The youngest children		
Women educ.	-.005	.039
Curr. working	.038	.002
Wall	.056	.023
Write Roman	-.279	.001
R : 0.035		
Significance : 0.0006		
Older children		
Electricity	.527	.014
Write Roman	-.349	.098
R^2 : 0.049		
Significance : 0.023		

7.5. Education

7.5.1. Education development

Traditionally education has been associated with the Day of Saraswati celebrated every 210 days. This is always due on Saturday when families collect all inscribed materials such as *lontars* and books and put them in a place where the offering to worship the goddess Saraswati is made. There has been a belief that no one should read on that particular day as a curse may come causing blindness. People call it *ajawere*, a warning of danger; this warning is usually found at the beginning of a text especially if it contains formulae for black magic (*pengiwa*) or white magic (*penengen*).

The next day is called *banyu penaruh*. People go the beach, lake, river or wherever water to bathe is available. Before they go a fragrant water *toya kumkuman* is prepared from clean water smoked with sandalwood. Bathing, symbolizing purification of mind and body takes place early in the morning. Before dressing the *toya kumkuman* is splashed all over the body. A holy water *tirtha* is then sprinkled over the head and some drops are drunk to accomplish the purification. After praying to Saraswati, the goddess of science, all members of the family enjoy a feast of *nasi kuning*, the yellow rice, symbolizing health, welfare and readiness to learn and continue working.

Because of the avoidance effect of *ajawere*, people were restricted from access to reading and learning from various inscribed materials, specifically the *lontars*, until the Dutch colonists introduced the 'Western system' of education in Singaraja in 1875 by building *Eerste Inlandsche Schoolen* which had up to three years of classes. Later *Tweede Inlandsche Schoolen*, extending to the fourth and fifth years were also built, which in 1931 were extended to the sixth year, when the name was changed to *Holland Inlandsche Schoolen*. Before Independence there were 94 *Eerste Inlandsche Schoolen*, 25 *Tweede Inlansche Schoolen* and 5 *Holland Inlandsche Schoolen* all over Bali. There were two other schools for primary school teachers, one each in Singaraja and Klungkung (Budiastra et al., 1976/77).

Since Independence education has been developing steadily. There is an increasing number of schools, teachers and school-age children covered. The number of primary schools increased from 1240 in 1971 to 2684 in 1984, junior high schools from 170 in

1971 to 370 in 1984, and secondary high schools from 59 in 1971 to 188 in 1984. Graduates from Udayana State University (the only State University in Bali) also increased from 94 in 1965/73 to 512 in 1974/79 and to 3021 in 1980/84. The illiteracy rate of the population 10 years of age and over dropped from 52.3 per cent in 1971 to 37.8 per cent in 1980 and 28.7 per cent in 1985 (CBS, 1971, 1980 and 1985).

7.5.2. Maternal education

Education attained, especially by mothers, is among the socio-economic factors most frequently used as an indicator of development, hence of the level of infant and child morbidity and mortality. Evidence from the World Fertility Survey shows the impact of mother's higher education on child survival. In countries where women are more dependent on men the education of husbands is also important (Hull and Jones, 1986). Caldwell, Reddy and Caldwell (1983) in an investigation in South India found the education of the children's mothers to be a powerful determinant of infant and child mortality. Uneducated mothers experienced significantly higher infant mortality rates than those who had some secondary schooling. The authors explained how education has influenced this situation. The higher education of mothers means that parents-in-law are more likely to cede decision-making rights to them. Consequently they tend to have more initiative and behave more actively among their families, such as by bringing their children to the modern health services at an earlier stage of sickness and by sharing food more equally both between the sexes and between generations.

Education of women probably works through several paths in improving child survival, depending upon the socio-economic and cultural situation and development of the societies. A longer time spent by a mother in an educational institution will give her more chance to get not only knowledge both in general and specific fields but also more maturity in facing the future and solving problems. The age at marriage will increase, spouse selection will be more rational and getting a job easier. As the social-economic status is better the capability to have better housing conditions is higher. There will be more ability to use modern health services for antenatal care, delivery, postnatal care and child care. There will be better knowledge on giving breastmilk including colostrum, introducing food patterns according to the stage of growth and development, applying health promotion through courses on prevention, treatment and rehabilitation of physical

and mental disorders. Consequently the young children will accumulate more benefits for the improvement of their health and welfare with the result not only of longer survival but also of gaining better quality as human beings.

UNICEF (1985) shows a clear pattern of relationship between percentage literate and infant mortality rate. In countries where the infant mortality rate is very high (110 per 1000 and over) the percentage of adults literate is 37 per cent for males and 19 per cent for females, whereas in countries where the infant mortality rate is low (25 and less) the percentage of adult literates is very high, 88 per cent and over for males and 70 per cent and over for females.

Actually, Balinese have their own characters and language. Learning to write and read Balinese characters starts in elementary school. Balinese use the tip of a special knife, *pengutik*, to write the Balinese characters on a *lontar*, a kind of palm leaf. The prescribed *lontar* is usually accessible only to adult or even aged people, because it usually contains holy words, *mantram*. Every seven months or so Balinese people make an offering of the *lontar* and other books to worship Saraswati the goddess of science.

The illiteracy rates of the population over 10 years of age in Bali from the 1971 to 1980 census data and the 1985 Intercensal Population survey decreased from 40.2 per cent in 1971 to 25.8 per cent in 1980 and to 17.9 per cent in 1985 for males, and from 67.1 per cent in 1971 to 49.4 per cent in 1980 and 39.1 per cent in 1985 for females (CBS, 1971: 63-66; CBS, 1980: 42; CBS, 1985: 16). However, the illiteracy rates of both males and females among the population aged 10 years and over were higher than the average for Indonesia in 1971, 1980, and 1985 (Table 7-8). The illiteracy rates of females were higher than for males, and this difference was always higher in Bali than the average of Indonesia. So the illiteracy rates of Balinese women were not only much higher than those of the average Indonesian women but also than those of Balinese men.

In the 1980 and 1985 IFPNP surveys, mothers' illiteracy rates decreased from 34 per cent in 1980 to 32.3 per cent in 1985. Mothers with some Primary School education decreased from 37.7 per cent in 1980 to 35 per cent in 1985, while those with completed Primary School education remained the same at 23.4 per cent. Education attainment of completed Junior High School and over almost doubled for mothers from five per cent in

Table 7-8. Illiteracy rates (%) of population 10 years of age and over by age and sex, Bali, 1971-1985.

Age group (yrs)	Sex	Illiteracy rates (%) 1971a)	1980b)	1985c)
10-14	M	14.7	6.1	1.5
	F	30.7	11.7	4.2
15-19	M	16.3	9.4	2.3
	F	38.0	24.3	11.6
20-24	M	20.7	11.2	6.1
	F	52.4	31.2	19.1
25-29	M	26.7	15.0	10.0
	F	66.6	38.5	30.2
30-34	M	37.4	20.5	12.2
	F	78.2	58.8	35.7
35-39	M	46.0	25.4	16.2
	F	85.1	62.9	47.0
40-44	M	59.4	35.4	24.3
	F	91.3	74.3	62.4
45-49	M	64.3	44.6	27.5
	F	92.9	80.5	67.5
50+	M	81.9	64.8	55.1
	F	97.0	92.2	90.3
Total	M	40.2	25.8	17.9
	F	67.1	49.4	39.1
Indonesia *)				
	M	30.1	21.5	13.4
	F	52.0	38.9	27.6

Source: a) CBS, 1971.
b) CBS, 1980.
c) CBS, 1985.
*) Meyer and Larson, 1987.

M =male
F =female

1980 to 9.3 per cent in 1985. This level of education also increased among their husbands from 12.9 per cent in 1980 to 15.7 per cent in 1985. The notable thing about mothers' education in the 1980 and 1985 IFPNP surveys was its low attainment. Over 95 per cent of mothers in 1980 had only completed Primary School and still over 90 per cent attained only that level in 1985.

7.5.3. Influence of maternal education on children's nutritional status

Ware (1984: 193) stated four common ways of measuring educational levels: as a dichotomy between illiterate and literate; by the number of years of schooling completed; by highest level of schooling attained; and by qualification or degree attained. It is possible to use the first three ways for measuring mothers' educational levels in both the 1980 and 1985 IFPNP surveys, but, for the purpose of analysis between education levels and children's nutritional status, only the third way is used.

The prevalence of malnutrition in children under five years of age was generally higher among lower educated mothers in the 1980 IFPNP survey. However, the decrease in the prevalence of malnutrition in children in higher educated mothers was not great as shown by the statistically insignificant difference in the prevalence of malnutrition. This is probably because of the very small proportion of educated mothers who completed Junior High School and over for both the 1980 and 1985 IFPNP surveys. The prevalence of malnutrition in children decreased quite sharply at two transition points of mothers' education: from illiterate to some primary schooling; and from completed junior high school to completed senior high school (Table 7-9).

In the 1985 IFPNP survey the prevalence of malnutrition in children under five was slightly higher among literate than illiterate mothers. The pattern of the decrease especially between completed junior high school and completed senior high school mothers was similar to that in the 1980 IFPNP survey. The other similarity between the 1980 and 1985 IFPNP surveys was that the highest prevalence of malnutrition was recorded in the children of mothers attaining junior high school, except for the youngest children in the 1980 IFPNP survey, who had lower prevalence of malnutrition than those of illiterate mothers.

The prevalence of malnutrition in children declined drastically from completed junior

Table 7-9. Prevalence (%) of malnutrition in children under five by mothers' education attained, 1980 and 1985 IFPNP surveys.
(WFH)

Education attained	Prevalence (%) of malnutrition in children			
	Youngest		Older	
	%	N	%	N
	1980			
No schooling	41.3	264	37.0	135
Some primary	35.9	295	32.9	143
Completed Pr1)	34.1	185	28.9	83
Completed JH2)	35.0	20	37.5	8
Completed SH3)	25.0	20	10.0	10
Total	37.0	784	33.0	379
	1985			
No schooling	25.9	243	24.0	104
Some primary	25.0	260	25.0	100
Completed Pr1)	25.9	177	27.5	69
Completed JH2)	31.9	32	55.5	9
Completed SH3)	25.0	40	21.4	14
Total	26.2	752	26.0	296

1) Primary School
2) Junior High School
3) Senior High School and over

high school to completed senior high school in both the 1980 and 1985 IFPNP surveys and among the youngest and older children. Decrease in the prevalence of children's malnutrition also occurred from non-educated mothers to some primary educated mothers except among older children in the 1985 IFPNP survey. The small difference of the prevalence in children's malnutrition between the lower and higher educated mothers must be cautiously interpreted because of the composition of mothers' educational levels. As has been shown from the last two censuses and the Intercensal Population Survey, Balinese women had higher illiteracy rates than the average Indonesian women. The capability of mothers in this group probably was not powerful enough to be a modernizer. The number of mothers having completed junior high schooling and over, on the other hand was very small and its influence was dominated by the average value of the lower groups. So for the majority of mothers, who had attained only lower education levels, education might have caused no influence on children's nutritional status.

Multiple regression analysis found that a significantly ($P< 0.003$) lower prevalence of malnutrition in children aged under five years was correlated to higher mothers' educational level in the 1980 IFPNP survey. However, in the 1985 IFPNP survey higher mothers' educational level was significantly ($P< 0.04$) and negatively correlated to the nutritional status of the youngest children. Other education variables from the 1985 IFPNP survey which significantly and negatively correlated to nutritional status of the youngest children included mothers' and husband's ability in writing Roman characters ($P< 0.08$ for mothers and $P<0.04$ for husbands) and speaking Indonesian ($P< 0.10$ for both the mothers and husbands).

7.6. Housing condition

Housing condition is an important factor for health, especially for young children as they spend more time inside the houseyard than adults. In Bali, a newborn child will not be taken outside the houseyard until the age of about three and a half months. During this period and even after, he is left at home under the care of one of the household members except for breastfeeding. A study of the baseline data on the integrated family planning and nutrition program conducted in 1980 (Suryadhy et al., 1982) showed that when mothers were busy the grandparents were the most frequently in charge of childcare

whereas mothers only ranked second. Children are not allowed to play outside the wall or fence of the houseyard at certain times such as midday or after sunset for fear they will get sickness caused by evil spirits, or black magic, so the inhabitants of the household feel more secure and peaceful if they stay inside the houseyard. A large-sized houseyard may have other advantages to the owner of the houseyard such as for increasing the household's income generation, and more space for fresh air; these may indirectly play an important role in improving children's nutritional status.

7.6.1. House ownership

House ownership is important not only from an economic point of view, that is if families have their own house they will spend less than those who have to pay rent, but also from a health point of view. As is described in Chapter 2, when a new settlement is established, the selection of the location, the measures used both for the distance between each building and the size of each building, selecting the best time to start building, and making offerings for the houseyard, are all associated with the degree of prosperity, health, and peace to be attained by the inhabitants of the new house.

From the economic point of view, however, house ownership should be examined with care. Although living separately from the parents as soon as a child gets married is the most preferable, in certain situations the young couple may live in a house which is actually owned by the husband's parents in the same house yard. It is very common that the youngest son lives with his parents and has the right to own all the buildings in the houseyard after his parents have died. So in this case house ownership is not the same as with those who built their own houses soon after they married. In the analysis this difference is not specified.

7.6.2. Influence of house ownership on children's nutritional status

The information on house ownership was collected only in the 1985 IFPNP survey. Of the households in this survey 74.2 per cent lived in their own houses, 23.3 per cent in family compounds, and a small proportion in rented houses. A dichotomous analysis of whether families lived in their own houses or not showed that the prevalence of malnutrition in children under five was lower among families living in their own houses than others for both the youngest and older children (Table 7-10). A multiple regression

analysis found that lower prevalence of malnutrition in children was significantly (P< 0.06) correlated to families living in their own houses in the 1985 IFPNP survey.

Table 7-10. Prevalence (%) of malnutrition in children under five by by parent's house ownership, 1985 IFPNP survey. (WFH)

House ownership	Prevalence (%) of malnutrition in children			
	Youngest		Older	
	%	N	%	N
Own house	26.4	500	24.0	200
Not own house	28.7	174	31.3	64
Total	27.0	674	25.8	264

If the materials used to construct houses were used for the independent variable of children's nutritional status, higher quality of materials used for walls was significantly (P<0.02) correlated to the lower prevalence of children's malnutrition among the youngest children in the 1985 IFPNP survey.

7.6.3. Other aspects of housing

Other aspects of housing conditions collected in the 1985 IFPNP survey included the size of the houseyard, source of water used in the household, place of defaecation, and whether the households boiled water for drinking. All of these aspects may directly or indirectly affect the nutritional status of children under five years age living in the households.

There were 42.8 per cent of the households in 1985 having a houseyard of less than one hundred square metres; the average size of the houseyard was 2700 square metres. The size of the houseyard should be interpreted carefully because as mentioned previously, by tradition the youngest son usually lives with his parents and inherits the houseyard after their death. It is very likely that a family living together with the parents reported the size of the whole houseyard which in fact is owned by more than one family. Households living in rural areas sometimes do not even have a clear boundary of the houseyard which causes difficulty in estimating its size or otherwise makes for overrecording. Unfortunately these variables cannot be traced from the data because they were not specified.

The source of water used for drinking comprised tapwater 22.1 per cent, wells 43.6 per cent, and open surface water 34.1 per cent. The importance of source of water in relationship to children's nutritional status lies in the use of the water for drinking without boiling. Open surface water is more exposed to contamination particularly bacterial agents which without boiling can cause diseases such as diarrhoea. If drinking water is not boiled it is expected that sources other than tap water will cause health problems, especially to young children, and this in turn causes more problems in the nutritional status of children. So the main difference in the effect of the source of water on children's nutritional status would be whether the water is boiled before drinking; if it is, there is no need to analyse the different sources of water. Ninety three per cent of the households in the 1985 IFPNP survey boiled their drinking water. If the 6.8 per cent unboiled water was taken from open surface sources a higher prevalence of malnutrition among children under five years of age can be expected. The tap water, on the other hand, is mostly distributed by the water supply agency (PAM) according to community block. Therefore, it is argued that the use of tap water is related the socioeconomic status of the households.

The place of defaecation is related to environmental health. Defaecation in open areas instead of in latrines causes a higher possibility of spreading diseases through gastrointestinal transmission such as worm infestation, viral hepatitis, and infective diarrhoea. However, the use of latrines is usually associated with the availability of water to flush the latrines and to wash the buttocks after defaecation because toilet tissue is not only uncommon but also out of reach in terms of its price and availability. As with the distribution of tap water, it is argued that the use of latrines is associated with socioeconomic status of the households especially the education level of the households. So the use of latrines may not make a difference in the children's nutritional status. In the 1985 IFPNP survey 25.1 per cent of households used latrines, 33.8 per cent used the rivers, and 41.1 per cent other open areas.

7.6.4. Influence of other aspects of housing on children's nutritional status

The larger size of houseyard area was not proved to improve the nutritional status of children. The prevalence of malnutrition in the youngest children was 24.9 per cent among families with less than 100 square metres of houseyard area compared to 28.8 per cent among those with 100 square metres and over. The prevalence of malnutrition in the older children was 25.8 per cent among families with less than 100 square metres of houseyard area compared to 25.9 per cent among those with 100 metres and over. The higher prevalence of malnutrition in children among the households with 100 square metres and over of houseyard size may be explained by the finding that better educated mothers tended to have less than 100 square metres of houseyard size (Table 7-11). In other words having a larger size of houseyard in the 1985 IFPNP survey may be as important or even more important in influencing children's nutritional status than the difference in education composition.

The use of latrines for defaecation was influenced by mothers' education level. Better education of mothers significantly ($P< 0.001$) increased the use of latrines for defaecation in both the 1980 and 1985 IFPNP surveys. Besides, the use of latrines for defaecation by the households also significantly ($P< 0.001$) increased from 1980 to 1985 (Table 7-12). So the relationship between the use of latrines and socioeconomic status (education) of mothers cannot be disputed. The prevalence of malnutrition in children under five years of age in the 1980 IFPNP survey was lower among households using latrines for both the

Table 7-11. Households' houseyard-size (%) by mothers' education levels, 1985 IFPNP survey.

Mothers' education attainment	Houseyard-size (%) <100 m^2	100 m^2+	N
No schooling	40.9	59.1	324
Some primary	42.7	57.3	357
Completed Pr1	44.2	55.8	230
Completed JH2	47.0	53.0	88
Total	42.8	57.2	747

1) Completed Primary School
2) Completed Junior High School and over

youngest and older children. However in the 1985 IFPNP survey, families using latrines for defaecation had a higher prevalence of malnutrition in their children than those using other places for defaecation. The prevalence of malnutrition in the youngest children was 30.8 per cent among families using latrines compared to 25.7 per cent among those using other places. The prevalence of malnutrition in the older children was 31.3 per cent of those using latrines compared to 24 per cent of those using other places. So the influence of both mothers' education and the use of latrines was not strong enough to improve the nutritional status of children in the 1980 and 1985 IFPNP surveys.

The use of tap water was influenced by mothers' education. Better educated mothers

Table 7-12. Use of latrines (%) by mothers' education levels, 1980 and 1985 IFPNP surveys.

Mothers' education levels	Use of latrines (%)					
	1980			1985		
	Yes	No	N	Yes	No	N
No schooling	8.8	91.2	411	9.0	91.0	243
Some Pr 1	16.7	83.3	456	20.1	79.9	269
Compl. Pr 2	23.7	76.3	283	36.0	64.0	172
Compl. JH 3	46.7	53.3	60	74.2	25.8	66
Total	17.1	82.9	1210	24.9	75.1	750

1 Some Primary School
2 Completed Primary School
3 Completed Junior High School

significantly (P< 0.001) increased the use of tap water both in the 1980 and 1985 IFPNP surveys. Besides, the use of tap water also significantly (P< 0.001) increased from 1980 to 1985 (Table 7-13). So the relationship between the use of tap water and socioeconomic status (education) of mothers cannot be disputed.

The families using tap water in the 1985 IFPNP survey had higher prevalence of malnutrition in their children than those using wells or other open surface water. The prevalence of malnutrition in the youngest children was 32.9 per cent of those using tap water, 27.2 per cent of those using wells, and 23.0 per cent of those using open surface

Table 7-13. Source of water (%) by mothers' education levels, 1980 and 1985 IFPNP surveys.

Mothers' education levels		Source of water (%)			
			Open		
		Tap	Wells	Other	Total
1980					
No schooling		3.6	30.2	66.2	100.0
Some Pr 1		7.0	37.3	55.7	100.0
Compl. Pr 2		11.3	60.1	28.6	100.0
Compl. JH 3		15.0	58.3	26.7	100.0
Total	%	7.3	41.2	51.5	100.0
	N	88	499	623	1210
1985					
No schooling		18.4	33.6	47.9	100.0
Some Pr 1		17.8	47.2	34.9	100.0
Compl. Pr 2		25.0	50.6	24.4	100.0
Compl. JH 3		33.3	54.5	12.3	100.0
Total	%	21.0	44.2	34.7	100.0
	N	158	332	261	751

1 Some Primary School
2 Completed Primary School
3 Completed Junior High School

water.The prevalence of malnutrition in the older children was 35.1 per cent of those

using tap water, 24.6 per cent of those using wells, and 21.6 per cent of those using open surface water. In the 1980 IFPNP survey, the prevalence of malnutrition in children was 44.7 per cent of families using tap water, 33.9 per cent of those using wells, and 35.8 per cent of those using open surface water; the prevalence of malnutrition in children was 36.4 per cent among families using unboiled water compared to 30 per cent among those using boiled water. Thus, the prevalence of malnutrition in children under five in the 1985 IFPNP survey can not be explained by the type of water source. This is probably because the percentage of the households boiling water in the 1985 IFPNP survey was almost the same for all types of source of water (Table 7-14). Multiple regression analysis shows that the prevalence of malnutrition in children in the 1980 IFPNP survey was significantly correlated with the use of boiling water, but significantly and negatively correlated to the quality sources of water (see Table 7-7). The analysis suggested that boiling water is more important than the source of water in relation to children's nutritional status.

Table 7-14. Prevalence (%) of boiling water by source of water, 1980 and 1985 IFPNP surveys.

Source of water	Prevalence (%) of boiling water					
	1980			1985		
	Yes	No	N	Yes	No	N
Tap water	76.1	23.9	88	93.7	6.3	158
Wells	74.9	25.1	499	95.5	4.5	332
Open surface	54.1	45.9	623	91.2	8.2	260
Total	64.3	35.7	1210	93.6	6.4	750

7.7. Occupation

7.7.1. Labour force participation rates

Although occupation seems easy to understand, it is difficult to define. It can simply mean work during a certain period of time with or without payment. In the 1985 Intercensal Population Survey, for example, the Central Bureau of Statistics categorized population into two groups: 1. The labour force group comprised persons aged 10 years and over who in the previous week held a job (both working and temporarily not working because they were waiting for the harvest, were on leave, or for other reasons). Included in this category were persons who did not have a job but were looking for one, 2. The outside the labour force group comprised persons aged 10 years and over who spent most of their time in the previous week attending school, housekeeping, unable to perform any activity, or performing other activities which could not be classified as working, temporarily not working or looking for work (CBS, 1987: xlviii).

The labour force participation rates (LFPR) -measures used for the labour force- for Indonesia generally increased from 1980 to 1985, except for males in urban areas. The LFPR of males was more than twice that of females in both 1980 and 1985 in urban and rural areas, except in rural areas in 1985. The decrease of LFPR in the age group 10-19 years from 1971 to 1980 in all categories (urban-rural and males-females) is probably accounted for by more in this age group being currently enrolled in school (Table 7-15).

The LFPR of population in Bali in 1980 and 1985 showed the same picture as at the national level. Overall, the LFPR of males was higher than that of females and in rural areas was higher than in urban areas. In urban areas the percentage of population in the age group 10-19 years participating in work was higher among females than males. In rural areas this was found only in the age group 10-14 years. This figure also probably indicates that fewer females in the age group were currently enrolled in school (Table 7-16).

Balinese women are known as hard workers. In certain sectors there are not infrequently more women workers than men. Early in the morning they carry a full basket of anything on their heads to sell at the market, walking or riding a bicycle without holding the basket. Alongside a river on the way to the monkey temple of Sangeh they gather to collect sand to sell for building houses or road construction from early in the morning. They work on road construction probably with only one man acting as a supervisor.

Table 7-15. Labour force participation rate(%) by age, sex, Indonesia, 1980-1985.

Age group	LFPR (%) 1980 Urban	1980 Rural	1985 Urban	1985 Rural
Males				
10-14	3.3	15.2	2.7	14.3
15-19	27.2	54.8	19.7	52.0
20-24	67.5	84.2	62.7	86.9
25-34	91.9	93.9	92.4	97.4
35-44	95.6	95.2	97.3	98.3
45-54	88.7	92.7	94.3	96.8
55-64	67.4	84.5	68.7	88.5
65+	38.6	57.6	40.9	62.7
Total	60.0	70.6	59.9	72.3
Females				
10-14	4.7	10.9	3.5	9.5
15-19	22.3	34.4	19.8	35.5
20-24	27.0	36.0	35.2	43.7
25-34	28.4	39.7	35.3	49.3
35-44	33.4	46.2	39.1	57.5
45-54	36.2	47.8	42.1	59.9
55-64	25.9	38.6	32.1	48.1
65+	13.4	20.0	16.4	24.5
Total	24.0	34.6	28.1	41.1

Source: CBS, 1984 and 1987.

Table 7-16. Labour force participation rate (%) by age, sex, and urban-rural, Bali, 1980 and 1985.

Age group	LFPR (%) 1980 Urban	1980 Rural	1985 Urban	1985 Rural
Males				
10-14	3.9	15.6	5.3	21.2
15-19	22.8	50.5	15.1	46.3
20-24	60.7	86.9	56.3	81.9
25-34	93.6	95.7	89.1	97.2
35-44	93.5	95.5	97.6	98.7
45-54	88.4	92.6	94.4	97.2
55-64	72.0	81.9	70.9	87.1
65+	32.9	52.0	35.0	59.5
Total	56.3	70.3	55.1	71.7
Females				
10-14	6.2	16.7	9.7	21.5
15-19	29.5	50.3	28.7	52.2
20-24	39.9	50.2	58.7	67.6
25-34	41.2	48.7	57.1	71.4
35-44	50.8	49.2	65.2	77.3
45-54	44.7	44.2	60.3	68.3
55-64	29.6	34.4	37.3	57.3
65+	6.4	19.3	16.5	31.1
Total	33.0	40.8	42.8	56.5

Source: CBS, 1984 and 1987.

These are only a few examples of women's work which can be witnessed everywhere in Bali.

No wonder that outsiders can be very easily impressed by an island dominated by female population. Yates (1934: 76), for example, wrote that she sighted 70 per cent of the population was women. The fact is that Balinese women are very diligent and they are not restricted but are encouraged to do any skilled or unskilled jobs as a preparation for their future when they get married. To Balinese any work is good as far as it is manageable. That philosophy makes Balinese live actively and for women the activity is frequently considered to shape the beauty of their bodies. Men, on the other hand, do not just stay home. They carry heavy loads on their shoulders instead of their heads. They handle any jobs which are fit for men, usually out of sight. The higher LFPR of females than males under 20 years of age in the 1980 population census and 1985 Intercensal Population Survey (Table 7-17) is probably because more males are enrolled in school.

7.7.2. Mothers' working conditions and family income

In the IFPNP surveys mothers were asked whether they were currently holding a job. In the 1985 IFPNP survey information on work participation before and after marriage was also collected. In addition to the activities, monthly income per family was collected in the 1980 IFPNP survey.

7.7.2.1. Influence of mothers' working conditions on children's nutritional status

In the IFPNP surveys, currently working mothers increased from 37.4 per cent in 1980 to 54.3 per cent in 1985. Housekeeping was not categorized as working, unless there were really jobs to support the family income, such as breeding pigs, chickens, ducks, or quail. The prevalence of malnutrition in the youngest children was lower for mothers currently working for both the 1980 and 1985 IFPNP surveys. The prevalence of malnutrition in older children, however, was slightly higher for currently working mothers. These patterns of malnutrition between the younger and older children were also found in mothers' working conditions before and after marriage in the 1985 IFPNP survey (Table 7-18).

One of the explanations is that younger children get more and closer attention from their mothers than older children. Although mothers of younger children are working they

prefer either to take the children with them or to work at a short distance where they can still hear if the children are crying. An example of this was observed when I was an instructor of a compulsory official course to *Dharma Wanita*, the government officials' wives. One of them was a young mother who was breastfeeding. Instead of leaving her baby at home she asked a maidservant to mind the baby in a room next to where the course was conducted. When the baby cried she asked permission to breastfeed her baby and then returned to the course.

Mothers who have older children can work more freely without worry that their children are longing for them. The children are left at home under the care of other family members, usually the grandparents. When mothers come back home from work they are tired and have no time to care for the children; so the care of the children is fully the responsibility of the grandparents or other family members. This was observed at one of the weighing posts where children were accompanied by sisters or brothers, grandparents, or maidservants for weighing because their mothers were working. This kind of distance between older children and their mothers might be one of the causes for higher prevalence of malnutrition among older children of working mothers than of non-working mothers.

Multiple regression analysis found that in the 1985 IFPNP survey the prevalence of malnutrition in the youngest children was highly significantly ($P< 0.01$) lower among mothers currently working, and significantly ($P< 0.04$) lower among mothers working after marriage. Multiple regression analysis, however, did not show significant correlation between the lower prevalence of malnutrition in children and mothers' working status before marriage.

7.7.2.2. Influence of family income on children's nutritional status

Information on family income was available only in the 1980 IFPNP survey. Monthly family income ranged from nothing to 930 thousand *rupiah* (the Indonesian currency) with average of 33,403 *rupiah*. The amount of monthly income showed different effects on the youngest and older children. The prevalence of malnutrition in the youngest children increased with the increase of monthly family income. However, the prevalence of malnutrition in older children first increased from the income of 20 thousand to up to 39 thousand *rupiah* and then decreased to the lowest level (Table 7-18). The higher

prevalence of malnutrition with the higher income of the family in the youngest children might be confounded by the number of family members in that the higher the family size, the more likely that the income is higher (Table 7-19).

Table 7-17. Prevalence (%) of malnutrition in children by working conditions of mothers, 1980 and 1985 IFPNP surveys.
(WFH)

Mothers' working conditions *)		Prevalence (%) of malnutrition in children			
		Youngest		Older	
		%	N	%	N
Currently working					
1980	Yes	35.2	281	34.7	150
	No	38.0	503	31.9	229
	Total	37.0	784	33.0	379
1985					
	Yes	23.9	364	26.0	131
	No	31.0	310	25.6	133
	Total	27.0	674	25.8	264
Working before marriage					
1985	Yes	25.3	396	25.2	155
	No	29.6	278	26.6	119
	Total	27.0	674	25.8	264
Working after marriage					
1985	Yes	24.7	389	26.6	143
	No	30.2	285	24.8	121
	Total	27.0	674	25.8	264

*) Information on working before and after marriage available only in the 1985 IFPNP survey.

Table 7-18. Prevalence (%) of malnutrition in children by monthly family income, 1980 IFPNP survey. (WFH)

Monthly family income ('000 *rupiah*)	Prevalence (%) of malnutrition in children			
	Youngest		Older	
	%	N	%	N
<20	35.4	339	30.4	168
20-39	37.3	271	39.2	130
40+	39.7	174	28.4	81
Total	37.0	784	33.0	379

Table 7-19. Percentage of the households by number of family members and monthly family income 1980 IFPNP survey.

Monthly family income ('000 *rupiah*)	Number of family members				
	<3	3-4	5-6	7+	N
<20	46.7	48.7	39.4	22.3	522
20-39	46.7	35.2	32.4	34.8	417
40+	6.7	16.1	28.2	42.9	268
Total	100.0	100.0	100.0	100.0	1207

7.8. Conclusion

Despite the recognition of Bali by outsiders as a beautiful place, some socio-cultural aspects dominated and characterized by the majority community's religion of Hinduism seem to hide several obstacles to achieving a better standard of life. The belief that only a son can free parents from hell coupled with the patrilineal system, and the belief that a woman is more prone to be a *leyak*, the holder of black magical power instead of white magical power, are two of the aspects that may have intentionally or unintentionally discriminated against women, resulting in a reversal of expected roles in which women are normally involved such as in improving children's nutritional status.

Women's education levels in the socio-culturally Hindu community of Bali are among the lowest in Indonesia. Despite the much lower educational attainment of females than males the labour force participation rates of females in the younger-age groups, in fact, were higher than those of males. However, the low educational attainment of females may be resposible for their concentration in the most unskilled labour, for physically-oriented work instead of skilled labour for knowledge-oriented work. Thus, up to the present, it can be argued that the potentially efficient Balinese women are capable of using an increase in their education level as one of the most powerful tools to achieve a better standard of life for themselves and consequently their dependent children.

The lower prevalence of malnutrition in the youngest children, but higher prevalence in the older children for currently working mothers and those who worked before and after marriage, is probably because of the closer biological relationship between mothers and the youngest children rather than because of working conditions. When the children are still very young, mothers are always around so that more care can be given to them. As the children grow older and are able to play around the houseyard, mothers start to leave them to go to work. When children are crying either for something to eat or just from longing for warm love, their mothers do not know the situation, while grandparents or whoever cares for them are very likely to tell only the best to the mothers. Consequently, older children will suffer from accumulated neglect resulting in a higher prevalence of malnutrition. Establishing a childcare system would probably help in solving this problem. However, in certain conditions this should be subsidized by the government.

Higher family income levels, with a monthly average of around Rp 30,000.00 (equal to

about Australian $ 45.00) in 1980 did not prove to raise children's nutritional status. It was found that the higher the income, the more likely it was that there were more persons in a household; so the variable of income was confounded by the family size of a household in relation to children's nutritional status. Living in own house did show better nutritional status in children than in rented house although it was not significant.

The size of the houseyard, however, showed a negative relationship in that a higher prevalence of malnutrition in children was found in households owning a larger houseyard. An explanation for the possible confounding factors in this matter is that youngest sons are likely to stay in the houseyard of their parents and that older sons establish a new house. Another finding was that better educated mothers lived in smaller houseyards so although at present low education levels of mothers had little to do with children's nutritional status, mothers' education probably confounded the relationship between the size of houseyard and children's nutritional status.

The use of tap water, boiled drinking water, and latrines all increased significantly with the increase in mothers' educational levels. These also increased significantly from the 1980 to the 1985 IFPNP surveys. The use of more tap water, boiled drinking water (in the 1985 IFPNP survey), and latrines, however, did not show improvement in children's nutritional status. This could be the effect of a very small number of households using unboiled drinking water, which affects the average dominated by the use of boiled water, but for tap water and latrines, here again it is probably because of the domination of the majority of mothers in low educational levels.

Multiple regression analysis shows that some socio-economic variables were significantly correlated to children's nutritional status. The variables highly significantly ($P< 0.01$) correlated to the improvement of children's nutritional status included the currently working status of mothers (for the youngest children in the 1985 IFPNP survey), and mothers' educational levels (for the total children in the 1980 IFPNP survey); significantly ($P< 0.05$ and $P< 0.10$) correlated to the improvement of children's nutritional status includeds, practise of boiling the drinking water, and materials used for constructing the walls of houses, house ownership, mothers' working status after marriage, and the practice of boiling the drinking water (for the total children in the 1980 IFPNP survey).

Chapter 8
Conclusion

Changes in under-five children's nutritional status between 1980 and 1985 and between program *banjar* and non-program *banjar* have been analysed in this thesis. The main source of data was from the 1980 and 1985 integrated family planning and nutrition program surveys conducted in the households of pregnant women and lactating mothers in 78 *banjar* in eight regencies of Bali. The *banjars* were grouped into 39 program *banjar* which were 'treated' with program intervention from 1980, the first year of the program, and 39 non-program *banjar*, in which program intervention was gradually implemented. Children's nutritional status, expressed as Z-score, was derived from weight for height, weight for age, and height for age assessments, using the standard in *Measuring Change in Nutritional Status* (WHO, 1983). The weight for height Z-score of children's nutritional status was used as a single dependent or outcome variable in relation to some independent variables, using both cross-tabulation and multiple regression analysis. The independent variables were grouped into morbidity including program interventions, demographic characteristics, family planning practice, and socio-cultural factors. Following is a summary of findings and factors presumed to have supported the improvement in children's nutritional status in Bali.

Certain aspects of Balinese culture are favourable for a better nutritional status of children. The belief that a newborn is a reincarnation of the ancestors, the attitude and special treatment of honour to a child as a holy person or a god, the belief that evil spirits or black magical power is dangerous if a child is left alone which encourages a mother to be physically always close to her child for warmth, love and protection and breastfeeding, are all, in fact, priorities given to children which have potential for better nutritional status. The potential is greater with the belief that only a son can free parents from hell when the parents have died, which consequently encourages parents to give more care to their children so that they can live longer. The belief that if a mother does not breastfeed her children, her breasts will be sucked by demons on the way to heaven when she dies can encourage mothers to breastfeed their children.

Certain beliefs may cause the nutritional status of children to worsen. A child may be too much restricted from foods, or medications, because as a holy person it may be restricted from foods that are considered taboo or unclean, particularly meats from the four-legged animals such as pork and beef. Instead, a child may be fed only breastmilk until a late age which is insufficient to meet the demands of its growth and development. The avoidance of modern medication comes from the belief that the illness of a child is caused by the ancestors or God, and that the family should ask a traditional healer to come instead of taking the child to the modern health services. The belief that only the son can free the parents from hell can probably have negative effects on female children or other brothers if a family has more than one son. It is common that the youngest son remains living with his parents and inherits all the buildings in the houseyard when his parents have died.

The strong belief in the 'next life' is probably the main reason that almost all mothers breastfeed their children at least for a certain length of time and up to an average of around 18 months. Despite the significantly negative correlation between the period of breastfeeding and the prevalence of malnutrition proved in the 1980 IFPNP survey, the prevalence of malnutrition increased in the age groups 18-23 months and 24-29 months compared to the younger age groups for both the 1980 and 1985 IFPNP surveys. Taboos on a number of foods, as found in the study on nutritional profile of pregnant women and lactating mothers (Gunung et al., 1981), particularly on the protein source foods, and the lack of knowledge of food supplementation according to children's growth and development may be responsible for the increase in the prevalence of malnutrition in those age groups in addition to the transition of children from breastfeeding to adult foods. So in order to maintain or even improve children's nutritional status as they are growing, the key problem is not breastfeeding but rather the knowledge and practice of giving the children proper food supplements according to their growth and development and where possible to avoid unreasonable (except for religious reasons) taboos.

Children's nutritional status, particularly using weight for height assessment, improved significantly from 1980 to 1985. The program *banjar* made more improvement than the non-program *banjar*. However, the improvement was probably the result of many factors including the program's interventions. Some of these such as vitamin A distribution and immunization seem to be in the stage of 'health promotion' which probably will have an

impact on nutritional status only later in the progress of the program. Because of the role of health services, the lower prevalence of morbidity rates from skin diseases, measles, worms infestation, and diarrhoea led to lower prevalence of malnutrition in children. This finding differs from the findings of studies conducted in Guatemala and India (Gwatkin et al., 1980) where health services were not found to improve children's nutritional status, but it does agree with the Czech experience (Krikava et al. , 1973) where integrated health services were proved to be successful in improving the nutritional status of the community. So the integrated program conducted in Indonesia is preferable to departmentally or sectorally operated programs in improving the nutritional status of infants, children, pregnant women, and lactating women.

In the 1980 IFPNP survey, male children were younger, heavier, but shorter in the program *banjar* than in the non-program *banjar*; female children were older, heavier, and taller in the program *banjar* than in the non-program *banjar*. In the 1985 IFPNP survey, male children were younger, lighter, and shorter in the program *banjar* than in the non-program *banjar*; female children were older, heavier, and taller in the program *banjar* than in the non-program *banjar*. In the program *banjar*, male children were younger, lighter, but taller in the 1985 IFPNP survey than in the 1980 IFPNP survey; female children were older, but shorter in the 1985 IFPNP survey than in the 1980 IFPNP survey. In the non-program *banjar*, male children were younger, heavier, and shorter in the 1985 IFPNP survey than in the 1980 IFPNP survey; female children were older, heavier, and taller in the 1985 IFPNP survey than in the 1980 IFPNP survey. These anthropometric data suggested that there was a better nutritional status, using weight for age and weight for height assessments in the program *banjar* than in the non-program *banjar* in the 1980 IFPNP survey. The data also indicated possible improvement of the nutritional status of male children from the 1980 IFPNP survey to the 1985 IFPNP survey in the program *banjar* using height for age assessment and in the non-program *banjar* using weight for age assessment (Table 8-1).

The nutritional status of children under five derived from WFH, WFA, and HFA indicators was as follows: using the cut-off point below -3 S.D. (severe malnutrition), the prevalence of malnutrition from 1980 to 1985 decreased for WFH and WFA, but increased for HFA; using the cut-off point below -2 S.D. (moderate malnutrition including severe malnutrition), the prevalence of malnutrition from 1980 to 1985

Table 8-1. Average weight (kg) and height (cm) children aged under five years, by sex and *banjar*, 1980 and 1985 IFPNP surveys.

Banjar	Sex	Average Age (mo.)	Average Weight (kg)	Average Height (cm)
		1980		
Program				
	Males	18.0	10.1	73.3
	Females	20.3	9.5	78.5
Non-program				
	Males	19.2	9.9	77.5
	Females	17.3	9.0	75.0
		1985		
Program				
	Males	17.5	9.9	76.3
	Females	20.6	9.5	77.0
Non-program				
	Males	18.1	10.0	76.7
	Females	19.5	9.3	76.0

decreased for WFH and WFA, but increased for HFA; using the cut-off point -1 S.D. (mild malnutrition including moderate and severe malnutrition), the prevalence of malnutrition from 1980 to 1985 decreased for WFH, but increased for WFA and HFA. Assuming that the assessment of weight for age was normal, all cut-off points used to analyse the changes of malnutrition prevalences from 1980 to 1985 tend to the interpretation, according to WHO (1983: 27) that children in the surveys were either normally fed with past history of malnutrition or currently overfed with past history of malnutrition. Since there was no single outbreak of famine observed or reported during

the period from 1980 to 1985 in Bali, it can be assumed that the interpretation of past history of malnutrition among children under five can be excluded from the 1985 IFPNP survey and the interpretation of normally fed or currently overfed can suggest that there were more recent efforts to control inhibition factors on one hand and accelerating factors on the other in improving children's nutritional status, whether by the integrated program alone or with other sectors.

In 1980, the prevalence of severe malnutrition in the program *banjar* was lower for WFH, WFA, and HFA than in the non-program *banjar*; the prevalence of at least moderate malnutrition (i.e. including severe malnutrition) in the program *banjar* was higher for WFH, equal for WFA, but lower for HFA than the non-program *banjar*; the prevalence of at least mild malnutrition (i.e. including moderate and severe malnutrition) was higher for WFH, WFA, and HFA than in the non-program *banjar*. In 1985, the prevalence of severe malnutrition in the program *banjar* was lower for WFH and WFA, but higher for HFA than in the non-program *banjar*; the prevalence of at least moderate malnutrition was lower for WFH, but higher for WFA and HFA than in the non-program *banjar*; and the prevalence of at least mild malnutrition in the program *banjar* was higher for WFH and WFA, but lower for HFA than in the non-program *banjar*. If the differences between the program and non-program *banjar* could be attributed entirely to program activity, then the program may have resulted in a decrease in the prevalence of at least mild malnutrition for HFA, decrease in prevalence of at least moderate malnutrition for WFH, but increase in prevalence of moderate and severe malnutritions for HFA, and no influences on the other indices.

In 1980, the prevalence of severe malnutrition in male children was lower for WFH and WFA, but higher for HFA than in female children; the prevalence of at least moderate malnutrition in male children was lower for WFH, but higher for WFA and HFA than in female children; the prevalence of at least mild malnutrition was lower for WFH, but higher for WFA and HFA than in female children. In 1985 the prevalence of severe malnutrition in male children was higher for all indicators than female children; the prevalence of at least moderate malnutrition in male children was higher for all indicators than in female children; and the prevalence of at least mild malnutrition was lower for WFH and WFA, but higher for HFA than female children. Therefore, the improvement of nutritional status in female children was better than in male children from 1980 to 1985.

Table 8-2. Prevalence (%) of nutritional status in children under five, by different S.D. cut-off points *banjar*, 1980 and 1985 IFPNP surveys.

Year	Banjar	Nutritional Indicator	Prevalence (%) of malnutrition — S.D. cut-off point: < -1*) Mild maln.	< -2**) Moderate maln.	< -3 Severe maln.	N
1980	Program					
		WFH	36.2	12.6	4.3	555
		WFA	58.3	27.2	5.3	589
		HFA	57.0	31.7	15.1	556
	Non-program					
		WFH	35.2	12.3	5.6	608
		WFA	58.0	27.2	8.7	622
		HFA	55.3	31.8	15.9	611
1985	Program					
		WFH	28.0	7.2	1.4	485
		WFA	62.9	27.3	6.9	491
		HFA	67.6	44.8	21.8	491
	Non-program					
		WFH	24.9	9.8	5.5	438
		WFA	59.1	25.3	7.4	443
		HFA	70.9	43.8	20.8	443

*) including moderate and severe malnutrition
**) including severe malnutrition

The much lower prevalence of severe malnutrition in program *banjar* than in the non-program *banjar* for WFH in 1985 can be regarded as a success for the program intervention. This is more clear from the prevalence of moderate including severe malnutrition for WFH indicator which in 1980 was higher in the program *banjar* but in 1985 it was lower in the program *banjar*. The immunization coverage rate increased significantly from 1980 to 1985. The prevalence of malnutrition in 1980 was higher among the immunized children for all immunizations except polio. The prevalence of malnutrition among the immunized children in 1985 was higher among immunized for all immunizations in program *banjar*, but lower among immunized for all immunizations in the non-program *banjar*. This might be the result of a more active referral system conducted in the program *banjar* for children who needed more care because of their

health problems rather than of immunization causing children's nutritional status. This better referral system can be regarded as a success of the program intervention activities.

Other factors which apparently contributed to improving children's nutritional status from 1980 to 1985 include: the program intervention, weighing activities, controlling worm infestation; health services, controlling diseases particularly diarrhoea and measles, practice of breastfeeding; demographic characteristics, types of marriage arrangements, smaller number of children ever born and smaller number of surviving children (because of smaller number of children ever born); better knowledge of the following contraceptive methods: IUD, pill, Norplant, menstrual regulation; better practice of contraception using IUD, pill, condom; socio-economic and cultural factors, ownerhip of houses, better quality of materials used for constructing houses specifically for the walls, mothers' levels of education, mothers' and fathers ability to write Roman characters and speak Indonesian, mothers' working status after marriage and at present, and practice of boiling the drinking water. The significance level of those variables in relation to children's nutritional status, using multiple regression analysis is presented in Table 8-3.

Special attention should be paid to the Balinese women's unexpectedly very low educational level. Education is responsible for many aspects of the modernization process (Caldwell, 1978) including efforts to improve children's nutritional status, so improving women's education will tend to be important in improving children's nutritional status. Most of the factors influencing nutritional status of children are directly related to the role of mothers. Mothers are the closest to infants for breastfeeding, food supplementation, and hygienic conditions. Mothers are the persons most closely involved in food preparation, food handling, storage, and distribution to the young children. Better educated mothers know how to choose more nutritious foods, know the nutrient contents of certain food sources, know how to prevent the loss of nutritive values in cooking, and know how to prevent contamination of foods. More educated mothers are likely to be economically more capable of supporting the family. More intensive nutrition education conducted in the program will undoubtedly accelerate the improvement in children's nutritional status, and as infectious diseases, personal hygiene, and environmental health become more controllable, more emphasis can be given to nutritional intervention activities.

Table 8-3. Significant levels (P) of various variables in relation to children's nutritional status, 1980 and 1985 IFPNP surveys.

Variables	Children under five		
	1980	1985	
	All children	Youngest	Older
Skin diseases	***a	***	
Fever	*a	***	
Measles	*a		
Diarrhoea			**a
Worm inf.			**a
Weaning	***a		
CEB	**a		**a
CSL			***a
Knorplant			*
EIUD		***	
Econdom		**	
Etraditional		***	
EMR			**
Current-users		***	***
Mothers' ed.	***	**a	
Curr. work mother		***	
Boil. water	*	**	
Walls		**	
Write Roman mother		***a	
father		*a	

*** P< 0.01
** P< 0.05
* P< 0.10
a negatively correlated
Knorp knowledge of Norplant
EIUD ever-users of IUD
EMR ever-users of menstrual regulation

In summary, the apparent improvement in under-five children's nutritional status dffered according to the measure used. It improved significantly from 1980 to 1985 according to weight for height, with the program *banjar* improving more than the non-program *banjar*; it improved slightly for weight for age but deteriorated slightly according to height for age in male children; it deteriorated slightly according to both weight for age and height for age in female children. These different changes in nutritional indicators can be interpreted as a sign that children were fed better more recently (WHO, 1983), which was partly the result of the IFPNP intervention activities and supported by Balinese socio-cultural factors favourable for the improvement of children's nutrition. Factors such as decline in fertility, caused mainly by practice of family planning, control of communicable diseases such as diarrhoea and measles, better economic condition of households with working mothers, and higher education of mothers (from the 1980 IFPNP survey but not from the 1985 IFPNP survey), all led to better nutritional status of children. Other factors such as the longer period of weaning, mothers' education in the 1985 IFPNP survey, and the use of better quality source of water were not proved to support better nutritional status of children. The longer period of weaning which worsens children's nutritional status is possibly caused by mothers' lack of knowledge of the proper system of giving food supplements; and the similar effects of different sources of water on children's nutritional status can be explained by the fact that almost the same percentage of families boil water irrespective of the source of water. There was no clear reason, however, for the negative effect of mothers' education on children's nutritional status in the 1985 IFPNP survey, except for the field observation that more educated mothers were likely to leave children at home where they may have sometimes been neglected.

The improvement of children's nutritional status in Bali between 1980 and 1985, then, appears to have been due to the synergistic effects of a number of factors. The impact of many of these factors has been apparent in the present study. But the factors affecting nutritional status are sufficiently complex that no study can expect to capture them all or to measure with complete accuracy of their relative importance.

APPENDIX A

The list of *banjar* study areas in Bali.

District	Village	*Banjar*	
		Program	Non-program
Negara	1. Berambang	Kendung	Berambang
	2. Lelateng	Ketapang	Terusan
	3. Pendem	Pendem	Satria
	4. Loloan Barat	Terusan	Kerobokan
	5. Sangkaragung	Samblong	Sangkaragung
	6. Dangintukadaya	Yehmakecir	Sebual
	7. Yehkuning	Tengah	Beratan
Tabanan			
	1. Delodpeken	Delodrurung	Gerokgak
	2. Gubug	Pande	Batusangihan
	3. Dajanpeken	Pasekan	Jambebaleran
	4. Wanasari	Belodan	Baleran
Mengwi			
	1. Sembung	Kuwum	Karangjung
	2. Penarungan	Belumbang	Dauhpeken
	3. Mengwi	Pande	Gambang
	4. Kapal	Panglan	Cempaka
	5. Buduk	Tengah	Sengguan
	6. Munggu	Sengguan	Dukuhpandean
	7. Sempidi	Pekandelan	Karangsuwung
Blahbatuh			
	1. Keramas	Medahan	Penulisan
	2. Bedulu	Wanayu	Mas
	3. Saba	Banda	Pinda
	4. Belega	Bonakaja	Bonakangin
Kusamba			
	1. Kusamba	Rame	Pande
	2. Gunaksa	Buayang	Patus
	3. Besan	Kawan	Kelodan
	4. Paksibali	Kanginan	Bucu
Bangli			
	1. Demulih	Talangjiwa	Tanggahantengah
	2. Sulahan	Sulahan	Tanggahangunung
	3. Penglumbaran	Seribatu	Temen
Karangasem			
	1. Padangkerta	Telugtug	Padangkerta
	2. Bugbug	Asakawan	Asakangin
	3. Tumbu	Ujungtengah	Ujungperasi
	4. Karangasem	Pebukit	Segarkaton
	5. Seraya	Tenggang	Pauman

Sukasada			
	1. Padangbulia	Padangbulia	Runuhkubu
	2. Panjianom	Abasan	Batupulu
	3. Selat	Selat	Batulada
	4. Gitgit	Gitgit	Pumahan
	5. Pegayaman	Baratjalan	Timurjalan

Source: Suryadhi, N.T., et al., 1982.

APPENDIX B

Governor instruction on the use of *banjar* system in the family planning program.

INSTRUCTION

NO.002/INS/2/1976

Considering:

1. That the *banjar* system is a powerful community organization which is respected by all of its members.
2. That institutionalization of family planning program through the *banjar* system will fasten its implementation in the grass-roots level.
3. That the community approach is needed to support to run the family planning clinics.
4. That the *Kelian banjar* is capable and respected by the *banjar* members to run the family planning program within the *banjar* system.

Considering further: That the extension of the family planning clinics into the levels of *banjar* covers quite wide areas.

Notifying:

1. The reports on the *banjar* system study in Bali between November and December 1975.
2. The letter of the Governor of Bali dated 4 December 1974, No. 556/P2/14/74.

Deciding:

INSTRUCTING

1. To carry out the family planning program through the *banjar* system in order to support the community approach via the clinics.
2. To improve family planning services in the clinics and hospitals.

3. The implementation of this instruction is under the responsibility of the *Bupatis*, head of the regencies, all over Bali, as the coordinator of regional family planning program to meet as best as possible its implementation.

Denpasar, 8 November 1978.
Governor as the Provincial Coordinator of the family planning program,

Signed

Soekarmen.

Source: FPCB-Bali, 1979.

APPENDIX C

The decision of Bali's House of Representatives on intermarriage arrangements.

BALI PROVINCE
HOUSE OF REPRESENTATIVE

Decision No.: 11/DPRD.

Notifying:

1. The changes in the community on the basis of the oneness in Nation, Language, and Country.
2. Certain marriage arrangements among *catur wangsa*, the four main groups in the community, do not meet the present situations.

Considering:

1. That changes are necessary to avoid any forms of discrimination in marriage arrangements to any groups in the community.
2. The wish to make a common agreement regarding intermarriage among the four groups in Bali.

Deciding:

1. To abolish the *peswara*, agreement of 1910 which was modified with a *besluit* of the Resident of Bali and Lombok dated 11 April 1927, No. 352 jic. as far as intermarriage of *asupundung*, and *alangkahi karangulu* is concerned.
2. To make the agreement on intermarriage between *catur wangsa*, the four groups.

   Paragraph 1. The so-called *catur wangsa* includes:
   1. *Brahmana wangsa*
   2. *Kesatria wangsa*
   3. *Wesya wangsa*
   4. *Sudra wangsa*

   Paragraph 2. The so-called *asupundung* is intermarriage between a girl from *brahmana wangsa* and a boy from *sudra wangsa*, *wesya wangsa*, and *kesatrya wangsa*.

   Paragraph 3. The so-called *alangkahi karangulu* is intermarriage between a girl from *kesatrya wangsa* and a boy from *wesya wangsa*, and *sudra wangsa*; or a girl from *wesya wangsa* and a boy from *sudra wangsa*.

Paragraph 4. The traditional law regarding the intermarriages stated in the above Paragraph 2. and Paragraph 3. is here abolished.

Paragraph 5. These rules and regulations can be amended for the intermarriges between the *catur wangsa* in Bali and starts into action on the day announced.

Approved by:
The Governor of the
Province of Bali.

Signed.

Sutedja.

Denpasar, 12 July 1951.
Head, House of Representatives
of the Province of Bali.

Signed.

I Gst. Pt. Merta.

Source: Astiti, 1981.

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